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VALUE CREATION AND COMPETITIVENESS OF TECHNOLOGY TRANSFER IN OLIGOPOLISTIC MARKET

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ABSTRACT

Peppiina Inervo: Value Creation and Competitiveness of Technology Transfer in Oligopolistic Market
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The aim of this study was to investigate value creation and competitiveness of technology transfer arrangements of a Finnish defense enterprise operating in a certain oligopolistic market. The study was executed as a case study. The base of the research was built by a literature review of the business environment, strategic decision-making process (SDMP), resource-based theory (RBT) and technology transfer.

Within the theory of business environment, the theoretical background presented definitions of micro environment and macro environment, business environment's relation to export strategy and the four market structures (perfect competition, monopolistic competition, monopoly and oligopoly). Prior to the execution of this study, the political environment had been identified as a significant factor of the business environment. Thus, the literature review presented the impacts of this environment on the business of a company. Furthermore, political behavior was discussed with the theory of SDMP. According to the RBT, a company consists of resources by which the competitive advantage can be reached. In addition to this, the theory also presented an aspect to the total monetary value and consumer surplus. Besides technology transfer, the theoretical background provided the six concepts of technology, classification of technology and the definition of technology transfer channels. Additionally, the aspect of capability gaps in technology transfer was discussed.

The stage of the case study was executed by collecting and then observing technology transfer related data in the case company. The research began with the preview of the company. This preview consisted of the determination of the business environment (differentiated oligopoly), the motives for technology transfer (offset requirements and competitive advantage), and the identification of channels and methods of technology transfer. Three research aspects were defined for the case study: the sending region, the receiving region and third regions. The research method in this study was the Company Strategic Landscape (CSL) framework that provided a comprehensive visualization of the research object. Value creation of technology transfer was investigated by the CSL from three aspects: the case company, the receiving region and third regions. Moreover, technology transfer arrangements were discussed in the light of RBT.

As a result of this research, one can argue why companies choose technology transfer as an export strategy. The results presented also how competitive advantage and value creation are generated through technology transfer arrangements. As a conclusion, this study suggested that further research among this topic could be focused on political behavior and political risks, and ecosystemic business thinking and the opportunities provided by strategic alliances.

Keywords: technology transfer, value-creation, oligopoly, SDMP, CSL, RBT

TIIVISTELMÄ

Peppiina Inervo: Teknologiansiirron arvontuotto ja kilpailukyky oligopolistisilla markkinoilla
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Tämä työ on tapaustutkimus suomalaisen puolustusteollisuuden yrityksen teknologiansiirtomenettelyjen arvontuotosta ja kilpailukyvystä kyseisessä oligopolistisessa liiketoimintaympäristössä. Työn teoreettisessa taustassa rakennettiin kirjallisuuskatsauksella pohja liiketoimintaympäristöön, strategiseen päätöksentekoprosessiin (SDMP), resurssipohjaiseen teoriaan (RBT) ja teknologiansiirron tapaustutkimukselle.

Liiketoimintaympäristön yhteydessä työn teoreettinen tausta esitti määritelmät yrityksen mikro ympäristölle ja makro ympäristölle, toimintaympäristön yhteydelle vientistrategiaan ja neljälle markkinarakenteelle (täydellinen kilpailu, monopolistinen kilpailu, monopoli ja oligopoli). Jo ennen tämän tutkimuksen toteuttamista poliittinen päätöksenteko oli tunnistettu yhdeksi erittäin merkittäväksi liiketoimintaympäristön tekijäksi, minkä vuoksi kirjallisuuskatsaus esitteli myös poliittisen ympäristön vaikutuksia yrityksen liiketoimintaan. Lisäksi poliittinen käytös nostettiin esille strategisen päätöksentekoprosessin yhteydessä. Resurssipohjainen teoria määritteli yrityksen koostuvaksi resursseista, joiden avulla kilpailukyky voidaan saavuttaa. Teoria esitti myös näkökulman muun muassa tuotteen kokonaisvaltaiselle rahalliselle arvolle ja asiakkaan ylijäämälle. Teknologiansiirron määrittelyn lisäksi työn teoreettinen tausta tarjosi näkökulmia teknologialle ja teknologiatyypeille sekä teknologiansiirtokanavien esittelyn. Kappale esitti myös erään näkökulman teknologiansiirron osapuolten välisiin kyvykkyyseroihin.

Tapaustutkimus toteutettiin keräämällä kohdeyrityksessä teknologiansiirrosta aineistoa, jota myöhemmin arvioitiin työn edetessä. Tutkimus alkoi yrityksen esittelyllä, joka piti sisällään yrityksen toimintaympäristön määrityksen (eriytetty oligopoli), teknologiansiirtomotiivien tunnistamisen (vastakauppavelvoitteet ja kilpailuetu) sekä yrityksen teknologiansiirtokanavien ja -metodien esittelyn. Tapaustutkimusta varten työhön määriteltiin kolme tutkimusnäkökulmaa: teknologian alkuperäismaa, teknologian vastaanottava maa ja teknologiansiirtokonseptiin liittyvät kolmannet maat. Tutkimusmenetelmänä työssä hyödynnettiin Company Strategic Landscape -viitekehystä, joka mahdollisti tutkimuskohteen kokonaisvaltaisen tarkastelun. Teknologiansiirron arvontuottoa tutkittiin työssä CSL -kartan avulla kolmea näkökulmaa painottaen: kohdeyritys, teknologian vastaanottava maa ja kolmannet maat. Lisäksi teknologiansiirtoa tarkasteltiin resurssipohjaisen teorian valossa.

Tutkimuksen tulosten perusteella pystyttiin argumentoimaan, miksi yrityksen hyödyntävät teknologiansiirtoa vientistrategianaan. Lisäksi tuloksissa esitettiin, miten kilpailukyky ja arvontuotto generoituvat yrityksen teknologiansiirtomenettelyjen kautta. Työn pohjalta tuleviksi tutkimuskohteiksi ehdotettiin poliittisen käytöksen ja poliittisten riskien sekä ekosysteemisen ajattelun ja strategisten liittolaisten mukanaan tuomien mahdollisuuksien syvällisempää tarkastelua.

Avainsanat: teknologiansiirto, arvontuotto, oligopoli, SDMP, CSL, RBT

PREFACE

This project started in January 2019 and as unbelievable as it feels, in August 2019 my studies at Tampere University are finally reaching the finish line.

Firstly, I would like to thank Tommi Svensk and Assoc. Prof. Tero Juuti for the topic of my thesis and all the help during this project. I certainly could not have wished for a better subject as this study discussed the phenomena in which my interest lies in. In addition to this, I am grateful to my colleagues for the continuous support and professional comments they have given me during this journey.

Studies at Tampere University have given me more than I could have expected. I have learned a lot and met splendid people from different cultures. Moreover, without the special ones, Elina, Minna, Oona, Tiina and Vilja, I would never have, among other things, tried to learn the lyrics of Shadow Of Your Love to impress someone. So, thank you, girls - you have made the past five years absolutely fabulous!

Finally, the greatest thanks goes to my family and Ilari who supported and cheered me up during this whole project. Now I understand the meaning of altruistic love.

“You can, you should and if you’re brave enough to start, you will.”

Stephen King

Kangasala, 30.8.2019

Peppiina Inervo

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LIST OF ABBREVIATIONS

CSR	Case Study Research
SDMP	Strategic Decision-Making Process
OCCAR	*Organisation Conjointe de Coopération en matière dÁrment* (Organization for Joint Armement Cooperation)
CSL	Company Strategic Landscape
PSP	Product Structuring Principles
RBT	Resource-Based Theory
ECP	Engineering Change Proposal

1. INTRODUCTION

1.1 Context

This study investigates the process of technology transfer in which technology is transmitted from its origin to new users. This procedure does not only refer to the actions between companies as technology can also be transmitted, for instance, from universities and research centers to commercial applications. However, this study focuses on arrangements between companies since the research is executed as a case study in a certain company.

As a phenomenon and among other things, technology transfer boosts the cross-border movement of personnel, products, information, capital and solutions. Moreover, the arrangements between companies in separated countries increase the internationalization of organizations and lead to the competence transfer within the business ecosystem.

This study is done as a part of the work duties of the researcher in the case company in Winter 2019. Aspects presented in this study are based on the literature, perceptions of the researcher and the discussions with the employees of the case company.

1.2 Background

The case company in this study is a Finnish enterprise that has executed technology transfer in several countries. Due to the transfer of technology, the company has provided competence for local manufacturing and maintenance capability to the customer regions. The case company itself produces mainly the pre-series in its international projects which provides a chance to identify the possible challenges related to the manufacturing. Furthermore, among the production of pre-series, the training of personnel of the receiving region can be executed in Finland. Though the company has lessons learned materials of all its previous projects, the procedure of technology transfer has remained almost unchangeable for a decade. Currently, this concept is based on the knowledge of personnel and their competence to teach the employees of the receiving region.

1.3 Unknown

Due to the unchangeability of the procedure, the company has now identified the need for deeper investigation of the process. Previously, the focus in the company has been more on the physical product and its development and thus comprehensive competitive advantages of technology transfer have not been identified. In the field of this certain industry in which the case company is operating, the high-quality product alone does not guarantee success in the markets. Thus, the company aims to fulfil the customer needs via the benefits gained through technology transfer. As several Finnish companies offer their customers an ability for local manufacturing, the topic of this study is also interesting from the perspective of Master's Degree Programme in Mechanical Engineering of Tampere University.

1.4 Research aim and objective

The purpose of this study is to investigate the technology transfer procedure in the case company. The aim is to identify and discuss through technology transfer reached value-creation from three perspectives: the sending region, the receiving region and third regions. The most relevant of these are the first and the second one. As the case company operates in an oligopolistic industry, the study deals with technology transfer in this certain market structure. An oligopoly is an imperfectly competing market form where a company does not gain competitive advantage through the same manners as in perfectly competing markets. Nevertheless, all the aspects presented in the literature review are not limited to oligopolies and thus they are generally relevant to other industries as well. Since the case company operates in an environment in which politics have a meaningful role considering the procurements, the study aims to observe and discuss technology transfer by taking also the political environment and strategic decision-making into account.

The objective of this study is to find out why the case company has chosen to serve its customers through technology transfer related manners instead of an off-to-shelf product. In addition to this, the study has two sub-objectives. The first of these is to clarify how the case company reaches a competitive advantage against its competitors through technology transfer procedure. The second sub-objective is to find out how the technology transfer generates value-creation for the parties that are related to this concept.

1.5 Research questions and strategy

Considering the aim, objective and sub-objectives of this study, there are three relevant research questions:

- Why does the case company use technology transfer as the export strategy?
- How does the case company reach a competitive advantage through technology transfer?
- How does the technology transfer generate value-creation for the regions related to this procedure?

This study is executed as a case study. According to the Farquhar (2012, p. 5), case study allows the researcher to observe a certain phenomenon in a context. In this case, as generally in business research (Farquhar 2012, p. 5), the research material is collected in a company where the research object occurs. Moreover, Farquhar (2012, p. 5) presents that case study is suitable as a research method for answering the questions that start with how, who and why. If the research was executed by observing a certain case of technology transfer to which the researcher could have an influence, action research had been considered as the main research method. Moreover, action research aims to develop the research object and this aim requires multiple rounds of actions after which the influence of them is detected (McNiff 2013, p. 90). In this study the time for the research is limited and due to this, the required several rounds of actions cannot be executed. Thus, a case study is more suitable choice for this certain research.

Yin (1994, p. 13, cited in Woodside 2010, p. 1; Farquhar 2012, p. 5) defines case study as follows:

"A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident."

By Woodside (2010, p. 1), Case Study Research (CSR) is described as below:

"CSR is an inquiry that focuses on describing, understanding, predicting, and/or controlling the individual (i.e., process, animal, person, household, organization, group, industry, culture, or nationality."

This study focuses on comprehensive description and understanding of technology transfer as a phenomenon in a certain market structure. Moreover, as the aim of the case study is to look explanations and gain understanding in a deep level, this research provides competence to the researcher to detect possible development areas in the related processes.

The structure of this study is determined to support the research. Moreover, by following this certain procedure, the satisfying results are more likely reached. The study follows three phases presented below in Figure 1.3. The base for the structure is adapted from Farquhar (2012).

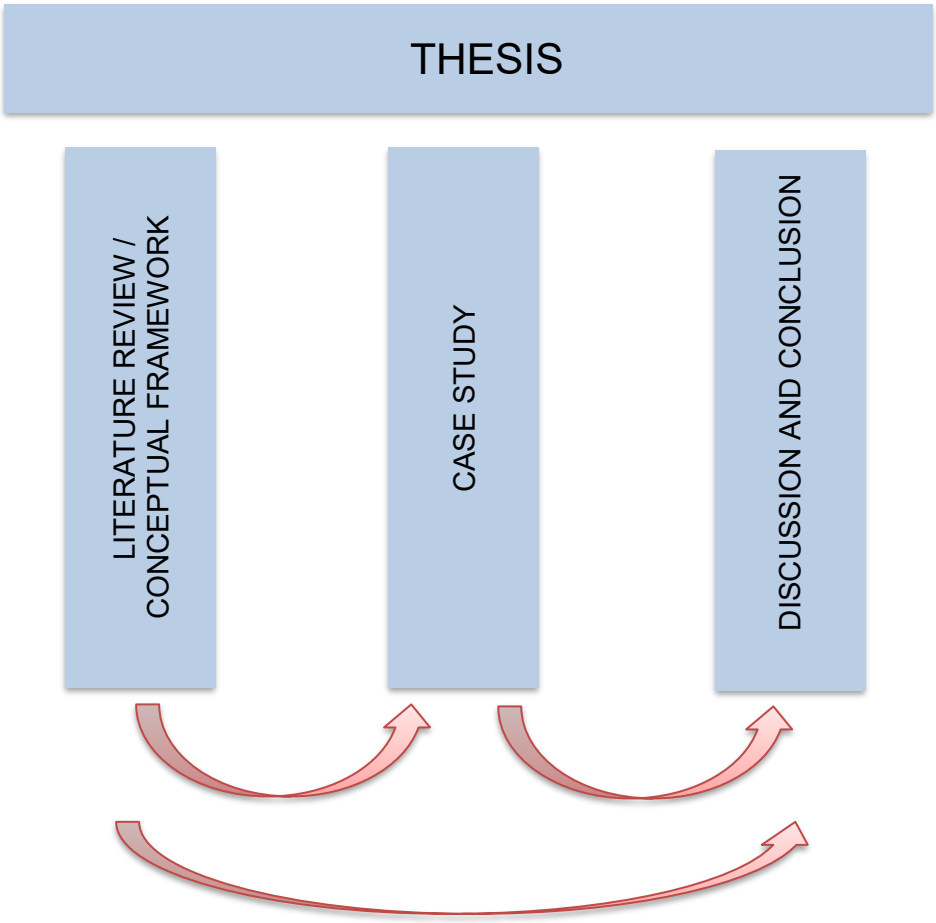

Figure 1.3. *Structure of the study.*

Each section of the thesis needs to be carefully formed and carried through so that it serves the overall aim of the research. The purpose of the literature review is to provide a comprehensive conceptual framework for the evaluation of the research object. The

case study section consists of data collection and analyzation. In this research, the collected data is qualitative as it does not contain measuring or numerical values. Farquhar (2012) presents that data collection methods should be the same in all cases. This research focuses on one case (technology transfer procedure of the case company) which is observed from three perspectives (the sending region, the receiving region and third regions). The third section of the study represents discussion and conclusion. The discussion section is linked to the conceptual framework as in this phase the results and findings of the thesis are compared against the theoretical background. (Farquhar 2012.)

1.6 Results

As the result of this study, the target is to present what motives a company may have for the execution of technology transfer. In addition to this, the aim is to present the competitive advantage of the case company and the value creation for the regions related to this procedure. The goal of the study is also to identify the features of the business environment in which the case company is operating and the impact of them to the technology transfer related strategic decision-making.

The results of this study are qualitative as the research focuses on the understanding and describing of a phenomenon. If the study kept inside, for instance, economic indicators of the case company, the study would not give as generalized approach to technology transfer arrangements.

1.7 Implication

The results of this study provide an approach for technology transfer concept of a Finnish company. The results are also relevant to other regions and due to this, the study is interesting considering the international context as well. The case company gets a comprehensive presentation of the procedure by which it serves its customers. Moreover, due to this study, potential development areas of the technology transfer arrangements and its impacts to the ecosystem can be observed.

For Tampere University the study presents a new research among this phenomenon. The research provides a current aspect to the competence transfer that is due to a competitive business strategy of a certain company. The study challenges the reader to think new approaches to the execution of programs and projects in international context.

2. THEORETICAL BACKGROUND

The theoretical background represents the conceptual framework for the research. This chapter discusses the business environment, strategic decision-making, resource-based theory and technology transfer. The researcher has selected these certain areas considering the aim of this study. The business environment is the context that determines the operations and existent of a company. It generates challenges, threats and opportunities that companies aim to handle through suitable business strategies.

As technology transfer arrangements are undoubtedly related to strategic decisions of the seller and the buyer, theoretical background presents an aspect for strategic decision-making. This section discusses this phenomenon in both inside and outside an organization.

The effective operation and sustainable competitive advantage of a company are generated through the combination of its resources. As the case company builds its operation on a concept that differs from off-to-shelf production, it is reasonable to observe its resource management. Due to this, the resource-based theory is presented and later utilized in this study.

The technology transfer section provides a comprehensive approach to this phenomenon. Moreover, the chapter discusses technology as a concept (soft technology and hard technology) and presents varying approaches to it. By the base of this section, we have a framework through which we can detect the content of technology transfer concept in the case company.

All the sources for this study are collected from the database of Tampere University academic library (Andor). The researcher has used such keywords as technology transfer, business environment, strategy, market structure, political environment, strategic decision-making, political decision-making, value creation, ecosystemic business thinking and oligopoly. Most of the sources are found through other sources due to the increased knowledge of the researcher during the writing process and research of this study.

2.1 Business environment

This chapter defines the concept of the business environment and four types of market structures. In addition, the chapter discusses the impact of the political environment related to business practices.

2.1.1 Definition and the relation to export strategy

The business environment is the outside context in which a company is operating. It is a combination of social, cultural, economic, political, legal and technological factors that are consistently affecting everyday operations of a company. (Wetherly & Otter 2011, p. 19.) Every organization confronts these external factors which are beyond the control of individuals. Nevertheless, though the business environment tends to generate a wide array of variable threats, it offers multiple opportunities as well. (Cherunilam 2010, p. 2; Wetherly & Otter 2011, p. 19.) The avoidance of the threats and the capture of the opportunities is the aim of every company and can be reached through the successful business strategy that responds to the environment of a business. Thus, can be stated that the business environment represents a framework to the competitive business strategy of a company.

The literature separates business environment into micro environment and macro environment. Micro environment can be described as a combination of the industry environment and operating environment. In other words, it consists of such factors as suppliers, competitors, the public and marketing intermediaries that are straightly related to a firm. The micro elements may be the same for two firms competing in the same industry and hence the success of a firm depends on its capability to cope with these elements. The macro environment is the more distant environment of a company and it consists of political and global elements, among other things. This environment is the framework in which a company and the elements of its micro environment are operating. Previously presented threats and opportunities of the environment are elements generated by the macro environment. Due to this, the macro environment is stated as uncontrollable to companies. (Cherunilam 2010, p. 8.)

According to Cherunilam (2010, p. 2), a business decision made by the management of a firm is often influenced by both internal and external environment. Therefore, the business does not confront only previously presented external factors of the micro environ-

ment and macro environment, but the internal factors of a company are affecting business strategy too. Such factors as facilities, technological capabilities, marketing resources, financial policies and human resources can be identified as internal factors of a company. All factors mentioned above are affecting the competitiveness of a firm. For instance, if the production capacity (facilities) is low, a firm does not gain a vantage against its competitors with mass production. (Cherunilam 2010, p. 4.) Hence the reach of the competitive advantage requires the formation of an effective and divergent export strategy based on the strengths of a firm such as competent and skillful personnel. The relation of the internal environment, export strategy and external environment based on the previously presented aspects is visualized below in Figure 2.1.

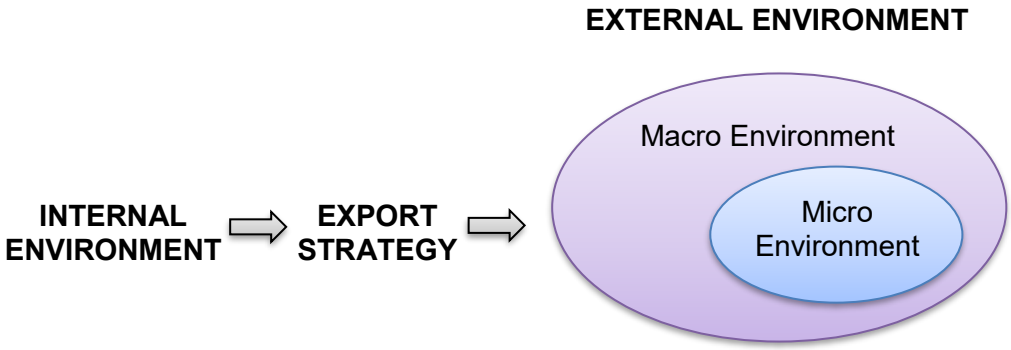

Figure 2.1. *The relation of the internal environment, export strategy and external environment, adapted from (Cherunilam 2010, p. 2.)*

The Figure aims to illustrate how a company transfers an output of its business to the external context. An internal environment is the one where all the decisions considering the business are made but their effectiveness cannot be comprehensively forecasted before the actual action towards the external environment.

2.1.2 Oligopolistic market

Generally, the literature identifies four types of market structures: perfect competition, monopolistic competition, monopoly and oligopoly.

These four market structures are presented below in Figure 2.2.

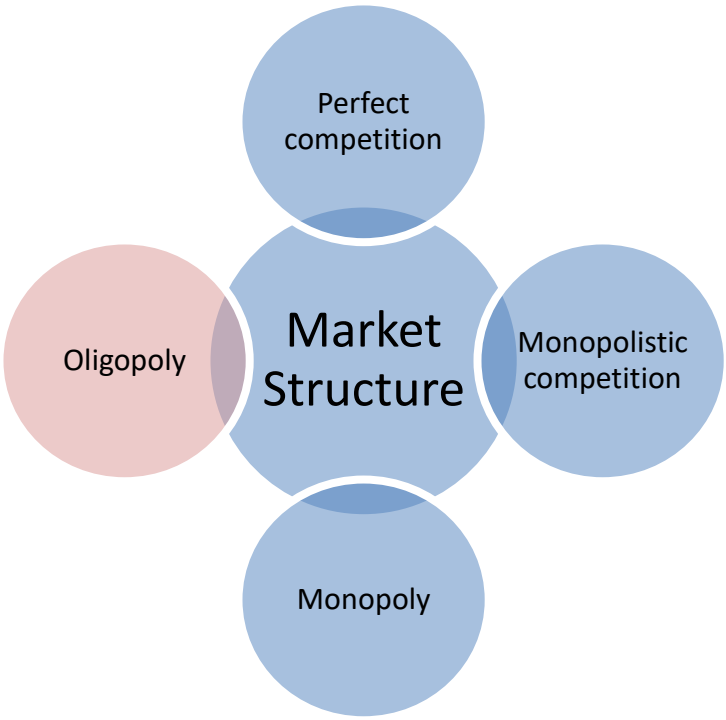

Figure 2.2. *The four market structures.*

Perfect competition is a market in which neither the seller nor the buyer has an influence on prices since supply and demand are in equilibrium. Such a market is characterized by free entry and exit, perfect information about the prices and diversity of small sellers and buyers. Monopolistic competition describes a market form of many competing sellers offering a certain product or service that are alike but not identical. Unlike in perfectly competing market, in monopolistic competition, the seller has an ability to affect market prices. Monopoly is a market where operates only one seller who serves multiple buyers. Thus, the seller has overall control of the trade and prices. In general, governments attempt to eliminate monopolies as they are against respectable trade. (Onozaki & Yanagita 2003; Law 2016.) Oligopoly is an imperfectly competing market in which only a few large sellers with interdependent products are operating (Caldwell & Howard 2014; Rosenberg & O'Halloran 2014; Taylor 2011). This study investigates a firm operating in an oligopolistic industry.

The exact number of firms is not relevant when defining an oligopolistic industry as the main feature of the market is that most of the output is offered by a couple of producers. In contrast to the perfectly competing market, the oligopolistic industry is frequently characterized by high prices, low productivity, bounded rationality and high transaction costs. (Caldwell & Howard 2014; Rosenberg & O'Halloran 2014; Taylor 2011.) Thus, companies operating in that field of the industry do not gain a competitive advantage through the traditional manners of strategic planning.

The most well-known models of oligopoly are presented by Cournot (1838) and Bertrand (1883). In the Cournot model, the competition between the firms is based on the quantity of output they produce instead of the price. The decision considering the output is made independently by every firm, but the demand of the consumers stays unchangeable to everyone. In Cournot competition, changes in the production level are not effortlessly made and thus the industry output may not be socially efficient. Bertrand competition can be referred to as the opposite situation to the Cournot model. The Bertrand model is based on price and it assumes that firms are producing homogeneous products. Thus, the competitive advantage against others can be reached through price wars that traditionally tend to occur in oligopolies. (Rosenberg & O'Halloran 2014.) As a conclusion, in Cournot competition, a change in the production level of one firm forces other firms to modify the quantity of their output too. In Bertrand competition, pricing changes made by one firm affect the pricing of others as well.

An oligopoly can be shaped by firms offering either homogeneous or differentiated products. In the case of the homogeneous products, the market form is called a pure oligopoly. This type of oligopoly is rare but still occurring at familiar industries such as among with steel or cement producers. A differentiated oligopoly consists of firms offering the same product with slightly varying features. For instance, the automobile industry, the defense industry and the airline industry are all differentiated oligopolies. (Rosenberg & O'Halloran 2014.) All of them have exactly the same clientele to which they temp to affect through their business strategy. One could assume that a firm operating in a differentiated oligopoly would most likely face Cournot competition since the decision of a customer is not simply based on the price of a product. In other words, a firm selling for the lowest price does not automatically gain a competitive advantage against others. In contrast, a pure oligopoly is characterized by Bertrand competition due to homogeneous products.

It has been identified that especially in an oligopoly, a seller needs to be able to form an effective business strategy when aiming a vantage against competitors (Rosenberg & O'Halloran 2014). The formation of a competitive and capable business strategy depends on the nature of an oligopoly and this study focuses to investigate a strategy based on the technology transfer from one region to another. The nature of this certain oligopoly is discussed more specifically in Chapter 3.1 when the business environment of the case company is defined.

2.1.3 Impact of political environment

The political environment can also be referred to as the regulatory environment since it presents the regulatory framework of government to every business. The economic system and economic policy are continually affected by this environment which is characterized by guidelines, codes, policies and laws. In addition to the laws controlling the matters related to the investment, in most countries, there are laws regulating the procedure of the business. By the laws, the government may specify standards for imported products or even ban the marketing of certain goods. Furthermore, even if the marketing is allowed, its nature may be restricted by the local government. (Cherunilam 2010, p. 11-12, 29.)

In a nutshell, policies can be defined as an activity which determines how a society should be organized. Furthermore, policies indicate the attitude of governments to a certain type of business and industries. (McKellar 2010, p. 4; Cherunilam p. 13.) According to Cherunilam (2010, p. 29), the four most important policies related to the international business are as follows:

- Industrial Policy;
- Export-Import Policy;
- Monetary Policy; and
- Fiscal Policy.

Since the business is constantly influenced by the political environment, certain changes in government policies may have a significant impact on the business environment of a company. (Cherunilam 2010 p. 13.) Government can regulate the business by two kinds of controls: direct and indirect. Indirect controls are generally based on the fiscal and

monetary inducements or impediments. In other words, by indirect controls, a government can encourage or discourage certain activities by fiscal and monetary matters. For instance, a high import duty frequently discourages imports and at the same time, fiscal and monetary inducements may boost the development of export-oriented industries. The direct controls effect more fiercely to the business as they can be selectively applied to certain company or industry through the discretion of the government. (Cherunilam, p. 33-34.)

As previously presented ordinary business environment, the political environment tends to offer threats and opportunities that are generated by governmental policies (Cherunilam, p. 13). More specifically, such threats can be referred to as political risks that occur through certain political behavior aiming to influence politics. According to McKellar (2010, p. 3, 5, 12-39), political risks commonly base on the key trends and conditions such as international tensions, domestic unrest, expropriation and contract cancellation, and bureaucratic morass, among other things. These challenges have been among us for decades and will most likely remain issues in the future as well. In addition to the phenomena presented above, today companies may confront risks which origin is global multi-polarity, failed and failing states or global asymmetric warfare (McKellar 2010, p. 39-50).

McKellar (2010, p. 64) presents three sources for risks: political instability, weak governance and conflict. Political instability is characterized by political dissent. Though the level of dissent varies depending on geographical location and culture, disagreements are taking place continually all around the globe. The impact for such tension may become from both outsides or inside the government. Generally, when the origin of challenges is outside the government, they tend to have more visibility in our everyday life. This visibility occurs for instance through protests. (McKellar, p. 65-67.)

The second source of political risk is incompetent and unprofessional governance. Generally, weak governance occurs in developing countries, but we may perceive this character in developed countries as well to varying degrees. However, in a developing country, this kind of governance tends to be more crucial. According to McKellar, this is due to the persistence of personal rule in addition to a lack of resources and experience. The ability to afford training, education and technology is defined as the characteristics of good governance and for developing countries, these possibilities have remained out of reach. Moreover, many of these countries are an income of colonial powers that gener-

ates competition between the Western model of government and previous modes of gov-ernance. In the case of weak governance, personal rule refers to a group of key person-alities who see their position more like an official duty. These personalities may see po-litical institutions as a tool by which they can exercise their own interests. Thus, the entire system is prone to the effect of opinions generated by individuals. (McKellar, p. 64, 67-68.)

Conflict refers to friction between varying interests and social visions that occur among countries, subnational groups or ethnicities. For a firm that competes at the international level, conflict is characterized by political sensitivity and hostility when operating in a rival country. In addition, conflicts tend to generate disruptions in supply chains. (McKellar, p. 69-70.)

The aspects presented above are discussed more in Chapter 3.1 with the definition of the business environment of the case company. As political risks vary depending on the business context of a company, this study is scoped to focus on the heavy industry which refers for instance to large-scale industrial manufacturing. For a company operating in this industry may take years to implement itself in a certain environment. Moreover, these companies are generally working on state contracts or with state partners. (McKellar 2010, p. 54.)

2.2 Strategic decision-making

The ambition of strategic decisions is to respond to elusive problems by executing one of many multidimensional solutions. Generally, these decisions enquire deep knowledge about the object a decision concern. Strategic decisions rarely provide one best solution and thus the decision is based on variable possible outcomes. (Nutt & Wilson 2010, p.4.)

Strategic decisions determine the long-term future vision of an organization. Moreover, they demonstrate how the organization manages its business environment with both ex-ternal threats and opportunities. A strategic decision is not unequivocally defined as a decision can be highly strategic in one industry but not strategic at all in another. (Child et al. 2010, cited in Nutt & Wilson 2010, p. 105; Elbanna 2006.) Thus, in this chapter we examine strategic decision-making without taking a stand on its definition in a specific industry. Furthermore, since strategic decision-making process (SDMP) is an area of process research that aims to represent how strategic decisions are made, this concept

does not contain the implementation of strategic decisions. In addition, this chapter examines political behavior which is generally related to strategic decision-making. (Elbanna 2006.)

Frequently, SDMP is featured by bounded rationality that consists of unfinished and limited information among with the restricted time for the decision. Though an individual had access to all the relevant information, the limited time prevents its processing. Due to these factors, the optimized decision-making of an individual is distracted. Despite the bounded rationality, strategic decisions aim to reach the most effective solution in varying fields in current conditions. (Child et al. 2010, cited in Nutt & Wilson 2010, p. 110-111.)

In addition to bounded rationality, a relevant phenomenon related to SDMP is political processes. These days, the literature identifies two perspectives for political behavior. The first one considers politics inside the organization and can be refined further into two subcategories. The first subcategory examines politics among the members of an organization with the purpose to affect the outcome of SDMP. The political tactics of individuals occur as their ambition is to reach a result of SDMP that serves their own self-interests. The second subcategory inspects the political behavior between organizational units that attempt to disturb SDMP.

The second perspective for political behavior includes a wide array of actors from both inside and outside an organization. Internal actors cover individuals and units as were presented above. External parties can be factors such as government agencies, unions or customers. In a nutshell, this approach consists of all the influence addressed to SDMP. (Child et al. 2010, cited in Nutt & Wilson 2010, p. 108; Elbanna 2006.) In this study, the focus is on the second perspective. This approach is discussed more in Chapter 3.1 which, besides the business environment, introduces political behavior related to the case company of this study.

The two perspectives presented above are tied together by the fact that whether individuals are working inside or outside the organization, they will be affected by the outcome of SDMP. Thus, they tempt to influence the process to satisfy their own self-interest or the common interest of the group. (Elbanna 2006.)

The literature suggests, that both the intensity and form of political behavior considering SDMP can be forecast by antecedent conditions. Moreover, these conditions fall into three categories (Child et al. 2010, cited in Nutt & Wilson 2010, p. 118):

1) Relations with external organizations;
2) Organizational characteristics; and
3) The nature of the strategic decision in question.

External organizations may, for instance, be resources or governmental agencies and other institutions whose approval is needed for the business of a company. Child et al. (2010) present that a dependence on external parties places an organization in a situation comparable to a subsidiary relationship and thus the values and procedurals of those external parties become relevant for the organization as well. In other words, in the internal environment of an organization, they have an impact on operational arrangements and business strategy. Moreover, external parties have a meaningful role and need to be taken into account in SDMP as those parties can, for instance, revoke their support. (Child et al. 2010, cited in Nutt & Wilson 2010, p. 118-119.)

According to Child et al. (2010, cited in Nutt & Wilson 2010, p. 118-120), such organizational characteristics as centralization of power, the degree of horizontal differentiation within the organization and the presence of groups controlling the power to handle strategic possibilities are the ones encouraging personnel to political behavior. (Child et al. 2010, cited in Nutt & Wilson 2010, p. 118-120.)

Finally, the strategic decision itself may fertilize political behavior if it is, for instance, significant for organizational survival or resource allocation within the organization. Generally, the intensity of politicking increases among the relevance of decision to the phenomenon presented above. (Child et al. 2010, cited in Nutt & Wilson 2010, p. 118-120.)

2.3 Resource-based theory (RBT)

According to the resource-based theory (RBT), the organization can be defined as a combination of resources through which sustainable competitive advantage is generated. The resources are factors of the internal environment of a firm (Chapter 2.1.1) and the value of them is based on the relation in a certain market structure. Hence, one could argue that a resource which is valuable in one market may not be valuable at all in another. The literature identifies three aspects of the value of a resource. First, a resource

can be seen valuable if it has the prowess to interact with and utilize the factors of the business environment. In other words, the resource can capture the opportunities and avoid the threats of the environment. Another aspect suggests that a valuable resource enables better satisfaction to customer needs. This can occur through quality, quantity or costs of a product, for instance. The third aspect defines a resource valuable if it provides a firm a chance to conceive of or implement strategies that tend to increase both efficiency and effectiveness of business. (Bowman and Ambrosini 2000.) Considering the aim of this study and the business of the case company, all the three aspects are relevant and discussed in Chapter 5.5.

Bowman and Abrosini (2000) define a distinction between use value and exchange value based on the aspects of classical economists. Use value refers to the specific features and qualities of a product that offer the response to customer needs. Exchange value is the monetary amount of a commodity that is concretized when the trade takes place. In other words, exchange value refers to the price of a product. For a customer, the use value is more relevant and in monetary terms, it can be defined as the price that a customer is prepared to pay for the product in a monopolistic market. Rarely, this is equal to the price of the supplier. This price is stated as total monetary value by Bowman and Abrosini (2000). Almost without an exception, a customer pays less than the amount of total monetary value of a product and the excess is defined as consumer surplus. This aspect is presented below in Figure 5.1. (Bowman and Abrosini 2000.)

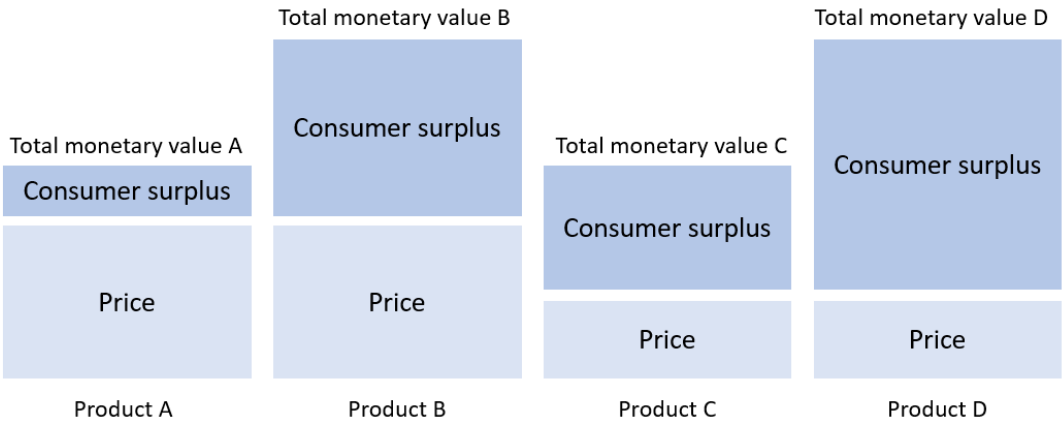

Figure 2.3. *Total monetary value, price and consumer surplus, adapted from (Bowman and Abrosini 2000).*

Figure 2.3 aims to visualize how the total monetary value can vary due to changes in price or consumer surplus. As use value correlates positively with consumer surplus, by improving the perception of this the benefits for a customer enchase. Thus, the total monetary value increases as well (Product B) compared to the starting position (Product A). At this point is relevant to notice that customers can only value what they perceive. Hence, the benefits need to be concretely visualized by the company. Though a firm has a competitive product it cannot reach a competitive advantage without concrete arguments for the benefits of the commodity. If the total monetary value is kept constant, consumer surplus can be risen by lowering the price (Product C). For a customer, Product D obviously presents the best option as it is a combination of low price and high consumer surplus. The seller rarely seeks an option based on the low price and thus a scenario that takes into notice both parties is Product B which has the same amount of total monetary value as Product D. (Bowman and Abrosini 2000.)

2.4 Technology transfer

This Chapter offers a theoretical framework for technology transfer. The chapter presents the definition of this phenomenon and the six concepts of technology. In addition, the classification and channels of technology transfer are discussed. As a conclusion, the chapter presents an aspect of capability gaps related to technology transfer.

2.4.1 Definition

Technology transfer is a process in which the technology is transferred from its original developer to the receiver that is operating in the same or a different field of industry (Robinson 1991 cited in Malm et al 2016). As the characteristics of the receiving business environment may differ from the origin of technology, the concept of technology transfer does not only refer to the use of technology for the same purposes in various companies – via transfer, new applications for existing technology can be reached as well. (Agmon & Von Glinow 1991, p. 1.) When the term of technology transfer was first used, it described the transfer of technology from R&D departments to commercial applications. Currently, this movement can be stated as vertical technology transfer and it refers to the industrialization of technologies developed by universities as well. The focus of this study is on so-called horizontal technology transfer which is characterized by the movement of technology between nations and companies. (Hsiung 1998.)

As a twin concept of international business, the technology transfer can turn out to be crucial to the business community due to its complexity. The dynamics of the business environment such as economic, political, social and cultural factors are affecting both of these phenomena. (Agmon & Von Glinow 1991, p. 1.) Moreover, the business environment has never been as unstable and rapidly changing as it currently is (Aswathappa 2009, p. 4). Thus, when the environment appears to offer new opportunities along with the multidimensional threats, these are highly affecting the transfer of technology as well. Furthermore, as the business environment of two companies is never homogeneous neither are the process of technology transfer nor the transferred package (Agmon & Von Glinow 1991, p. 7).

2.4.2 The concept of technology

As described in Chapter 2.2.1, the concept of technology transfer is never unambiguous as technology moves across the borders through multiple channels and in many different forms (Agmon & Von Glinow 1991, p. 7; Ricken & Malcotsis 2016, p. 38). Thus, before investigating more the process of transfer, we need a definition for the technology itself.

Basically, technology can be understood as knowledge related to a certain product or process. Yet, the description of the technology is not as simple since it has various definitions depending on the source. According to some authors, technology can be defined as a combination of a physical and informational component. The physical component consists of concrete elements such as products, models, techniques and processes. The informational component again is all know-how and expertise related to management, production, quality control and other functional areas. (Salanţă et al. 2018.) In consideration of the aim of this study, we have six relevant concepts of technology presented by Ricken & Malcotsis (2016, p. 17):

- Hard and soft technology;
- Explicit and tacit technology; and
- Product and process technology.

Hard technology is an embodiment of the invention which has then turned into a physical product. It is all the necessary information regarding the production or distribution of goods and services. Soft technology instead is a disembodied component as it consists of experience, skills and knowledge in fields of management, organization and marketing, for instance. (Jin 2005, cited in Botchie et al. 2018; Ricken & Malcotsis 2016, p. 17).

Thereby, hard and soft technology could be stated as two components described above: a physical and the informational. The efficient operation of technology requires both hard and soft technologies. Hence, it has been presented that when the aim is to gain effectiveness in technology transfer, both components must be formed and transferred. (Botchie et al. 2018.)

Instead of technology, a better classification for the third and fourth concept could be explicit and tacit knowledge. Explicit knowledge is know-how which is easily articulated in written form and verbally (Ricken & Malcotsis 2016, p. 19). Tacit knowledge is more complicate to verbalize, and it occurs via informally learned behavior and procedures of an individual while fulfilling every-day work duties. Hence, the transfer of tacit knowledge almost without an exception always requires face-to-face interaction between individuals (Botchie et al. 2018). This component should not be underestimated as it has a significant role in fields of organizational learning and economic competitiveness. (Ricken & Malcotsis 2016, p. 19; Howells 1996). According to the analyze of Grant and Gregory (Grant and Gregory 1997, cited in Bozeman 2000), the comprehensive transfer of tacit knowledge often leads to the more effective transfer of manufacturing technology as well. The distribution of knowledge into explicit and tacit form in a company is visualized in Figure 2.4 which is based on the technology iceberg presented by Ricken & Malcotsis (2016, p. 19).

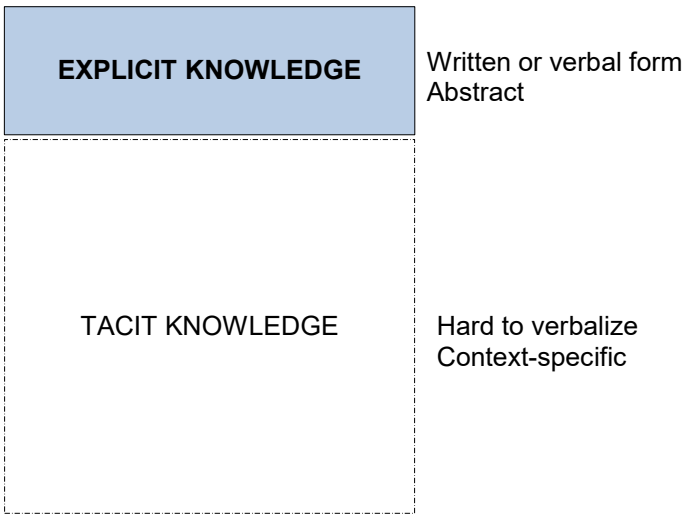

Figure 2.4. *The common distribution of knowledge, adapted from (Ricken & Malcotsis 2016, p. 19).*

Product technology is the technology which is related to the specific product that a company manufactures and sells to consumers. Changes in this technology can occur through the production of a compensatory product or the incorporation of new technology to already existing products. Process technology refers to the tools, materials, equipment and other technologies that are required to the production and development of goods and services. In process technology, changes can vary from minor improvements to radically new technologies, such as the automatization of the entire production. Already slight changes may help to gain a competitive advantage against others by lowering production costs or eliminating the errors related to the process. The relative importance to a company between product and process technology ranges along with the changes in the business environment. For instance, a company can first gain a competitive advantage by launching a pioneering product. However, once the competitors have been able to imitate the product, the company can achieve vantage by the development of its production. (Ricken & Malcotsis 2016, p. 20.)

Considering the definitions of hard and soft technology, they can be seen as combinations of Ricken and Malcotsis' four other concepts. This prospect is presented below in Figure 2.4.

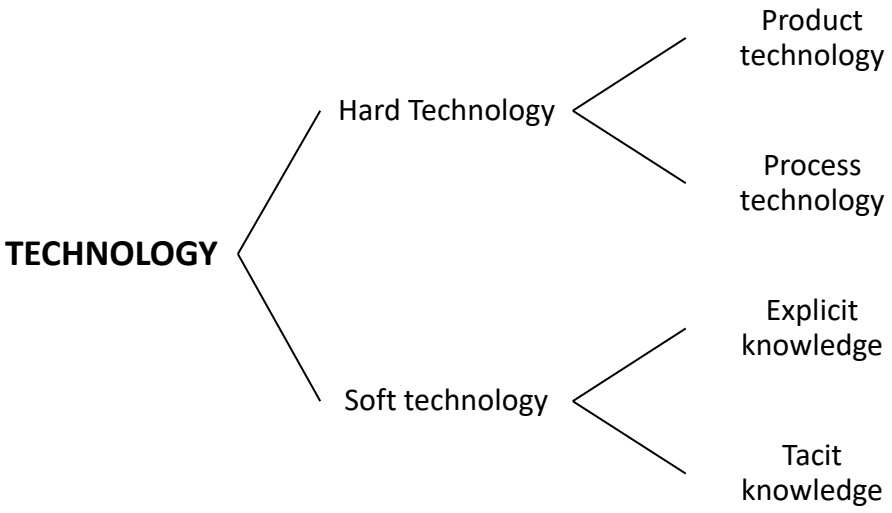

Figure 2.5. *The six concepts of technology.*

As an addition to the aspects presented above, the concept of technology can be chopped into manifold categories by the applications of it (Agmon & Von Glinow 1991,

p. 7-8; Bozeman 2000). First, we have technology which is related to basic civilian commodities such as automobiles. The second category consists of technology linked to defense and military items such as weapon systems. The sale and licensing of the technology in the second category are particularly controlled and distinctive. Furthermore, in most countries, actions related to defense and military technology require special government permission and, in some cases, its participation. Third, we have so-called dual-use technology which is originally developed for civilian purposes but can later have application in defense and military sector too. (Agmon & Von Glinow 1991, p. 7-8.) In this study, the focus is on the second category.

2.4.3 Classification and channels of technology transfer

Technology does not only have various forms and definitions, but it also moves across national borders through a wide an array of different channels (Agmon & Von Glinow 1991, p. 7). The most suitable channel for technology transfer depends on the embodiment of technology alias the transferrable object (Ricken & Malcotsis 2016, p. 38). Thus, at the beginning of this chapter is presented the classification of transferable objects based on the literature of Agmon and Von Glinow (1991, p. 8).

According to Agmon and Von Glinow (1991, p.8), transferable objects can be sorted out to three categories depending on their nature. These three categories are as follows below:

- Material-transfer;
- Design-transfer; and
- Capacity-transfer.

Material-transfer covers the movement of physical materials, such as final products, components or even turnkey plants. It has been argued if this process can be counted as the transfer of technology since the focus of this action is on the physical object instead of knowledge. Especially, in case of a turnkey plant, this kind of transfer represents a receipt of a finished product which is ready to use. Nevertheless, through material-transfer, the receiver can gain and absorb product technology as well if the local personnel are able to analyze the principles of the transferred object. In this case, the technology comes as a by-product of the purchased object. (Agmon & Von Glinow 1991, p. 8, 85.) Furthermore, this can also be the desirable outcome as material-transfer can only

be a part of the technology transfer between two parties and the rest of the agreement can be put into effect through different types of transfer. Altogether, the main aim of material-transfer is to provide the pursued commodity or the capacity for local production (Agmon & Von Glinow 1991, p. 8).

Design-transfer provides an ability for local manufacturing by the transfer of basic information, data and guidelines such as designs and blueprints. By design-transfer, the receiver reaches the capability to produce machines or products but remains dependent on the sender in case of any changes considering the design. (Agmon & Von Glinow, p. 8, 85).

Capacity-transfer is more severing to define and estimate. This transfer does not only provide the knowledge for local manufacturing but for product development too. A company receiving technology reaches an ability to innovate and adapt existing technologies and products. (Agmon & Von Glinow 1991, p. 8, 85.) Nonetheless, by innovative competence, capacity-transfer eventually leads to invents and improvements of existing technology beyond original design parameters (Sripaipan 1990; Kim 1997, p. 4-6; Erns et al. 1998; p. 17-18, cited in Wie 2005). However, capacity-transfer is not only the most troublesome to define but also both hardest to implement and the most fervently desired. (Agmon & Von Glinow 1991, p. 8.) Since companies are nowadays operating in a constantly changing environment, the development of new products and processes has even more significant role when chasing a competitive advantage. (Kim 1997, p. 4, cited in Wie 2005).

Technology transfer can take place through formal or informal channels. Informal channels, such as illegal imitation or reverse engineering, provide a conduit for transfer without formal agreements and payments (Kim 1999, p. 126, cited in Wie 2005). In this study, formal channels are discussed more precisely. Literature has identified a wide array of these channels and thus, we deal with most commonly used ones such as foreign direct investment (FDI), international trade, licensing, strategic alliances and joint ventures, and cross-border movement of personnel which keeps inside foreign education and training (Botchie et al. 2018; Tanaka et al 2007; Kim 1991, p. 125-127, cited in Wie 2005). Agmon and Von Glinow (1991, p. 9) present that, according to the original formulation of the product life cycle thesis, technology and production methods started to move overseas via FDI and technology licensing in the first place. Since FDI is still mentioned as a channel for technology transfer by all the sources, could be argued that it is still the most generally used.

FDI, which was identified as the most widely used channel, is a cross-border investment by which a resident entity aims to receive a lasting interest in an enterprise operating in another economy (Botchie et al. 2018; Blaine 2009, p. 7). A classic example of FDI is a company from one country building a factory in another region. FDI provides a great ability for both a host country and the foreign company to reach new technologies, processes, products and organizational technologies besides the management skills. (Blaine 2009, p. 7.) To be a successful channel for technology transfer, FDI requires imports of products, procurement of hard technology and absorption of soft technology. The absorption of soft technology is identified as the key challenge considering effective technology transfer. Thus, FDI can be an efficient channel only if the receiving economy has the necessary capacity to capture the transferred soft technology. Furthermore, a successful technology transfer through FDI in one country does not guarantee its prosperity in another region. (Borensztein et al. 1998, cited in Botchie et al. 2018.)

International trade refers to economic transaction between countries and is facilitated by international financial payments (Britannica Academic 2018). International trade provides a rapid way for the transfer of technology from its origin region to the foreign nation. It is most commonly used when the technology is transferred from a developed country to developing states. In this case, the transfer does not only contain knowledge but machinery as well. However, international trade is rarely the most economical way for the transfer as the costs of transfer varies depending on the transferrable object and the recipient country. If the aim is to transfer finished products or machines instead of/along with the knowledge, the costs of transfer increase significantly. Moreover, the geographical distance between the sender and receiver is linked to transporting costs. For instance, landlock countries will more likely face higher costs than their maritime neighbors. (Botchie et al. 2018.)

Licensing refers to an action in which a firm operating in one country (the licensor) authorize a firm in a foreign country (the licensee) to utilize its intellectual property such as technology, patents and technical knowledge. The roles of the licensor and the licensee may vary depending on the agreement since two firms can also share knowledge through cross-licensing that keeps inside mutual exchange between the parties. In cross-licensing, the cash payment is not always involved in the agreement. Franchising is a form of licensing in which the licensor (the franchiser) gives a privilege to the licensee (the franchisee) to absorb the prepared business model containing the relevant functions such as production techniques and business approach. (Cherunilam 2010, p. 95-96.) In any

case, through licensing agreement the licensee gains an ability to local manufacturing and thus the distribution rights of the product. Along with the technical information, the licensor also provides related knowledge to the licensee. (Hoekman et al. 2005.) Thus, when technology transfer occurs through licensing, other transfer channels are most likely involved in the process as well as the transfer of knowledge frequently requires foreign education and training.

Through strategic alliances, a firm can facilitate strategic coordination among competitors when the aim is to reach and increase market power. Furthermore, a meaningful motive for collaboration is the possibility to gain new technical skills or technological capabilities. Firm-specific technological capabilities are frequently based more or less on tacit knowledge that is not effortlessly conceptualized. If the aim is to sell or license such capabilities, the formation of a simple contract can occur to be challenging. Thus, alliances have an advantage over conventional contracts or markets. (Mowery et al. 1996.)

A joint venture occurs through the permanent collaboration of firms from two or more countries. The definition does not refer to pure trading operations but such arrangements as shared ownership and management. A joint venture can take place through the interest of a local investor to a foreign firm or the other way around. Foreign and local firms can also together form a new enterprise which then is referred to as a joint venture. In some regions, a joint venture may be the only way for an international enterprise to enter the market since fully foreign-owned firms may be banned. The main advantage of a joint venture is that it allows a firm with limited resource to expand its operations into more markets than might be possible through a whole owned subsidiary. Both strategic alliances and joint ventures help to avoid bounded reliability in a foreign region as the local partner is probably in a better position with the government and the public. (Cherunilam 2010, p. 95, 101.)

Cross-border movement of personnel has a meaningful role when soft technology is transferred. The firm receiving the technology has to learn how to use it effectively and thus the movement of personnel occurs when the technology requires complementary services from its host region. For instance, when the production is in the ramp-up phase at the receiving location, technical support of engineers and/or technicians of the sending region is highly valued. Through the movement of personnel, the workers of the sender have an ability to transfer their skills and expertise to the receiving party as well. (Botchie et al. 2018; Agmon & Von Glinow 1991, p. 89.) Thus, the cross-border movement of personnel provides a channel for foreign education and training.

The movement of personnel procedure could be improved further by handling this scenario as a type of technology transfer. In other words, besides previously mentioned three categories for the transferable object (material-transfer, design-transfer and capacity-transfer), the movement of personnel could be identified as one of them. For instance, we may have a situation in which the transfer does not only keep inside pure technology, but the original employees of the sender are appointed as personnel to the receiver. This could be contained in capacity-transfer, but as we want to highlight this aspect, it is presented as an individual category of the transfer.

Table 2.1 presents through which channel a certain type of transfer may be executed.

Table 2.1. *The relation between channels and types of technology transfer.*

	MATERIAL-TRANSFER	DESIGN-TRANSFER	CAPACITY-TRANSFER	EMPLOYEES-TRANSFER
FDI	•		•	•
INTERNATIONAL TRADE	•	•	•	•
LICENSING		•	•	•
STRATEGIC ALLIANCES AND JOINT VENTURES	•	•	•	•
MOVEMENT OF PERSONNEL			•	•

Obviously, in addition to the transferable object, the choice of the most effective channel depends on the contract between the sender and the receiver. For instance, if the receiver wants an off-the-shelf product, the trade is executed through international trade instead of licensing. In addition, the type of transfer does not only define the requirements for the transfer channel, but the choice of a channel affects the success of a transfer as well (Malm et al. 2016). For instance, tacit knowledge cannot be transferred through an FDI or international trade.

2.4.4 Capability gaps in technology transfer

Generally, the challenges considering technology transfer are related to the transfer of knowledge. Malm et al. (2016) present that there are always capability gaps between the sender and the receiver when technology transfer is implemented. These gaps are the

most troublesome if the sending and the receiving organization differ culturally and geographically or if organizations are operating in various fields of industry. In addition, when the receiver has limited experience in the type of transferrable technology, the gaps increase even more. Frequently, this is almost without an exception the case when transferring technology from the developed industry to developing regions. Though the diversity between the sender and the receiver offers new applications for the existing technology, it also grows the social and cultural distance between the organizations. If the capability gaps are not taken in the account, the activity between the sender and the receiver does not help to gain competitive advantage nor the ability to improve or develop. (Steenhuis & Bruijn 2002; cited in Malm et al. 2016; Malm et al 2016.)

The transfer of knowledge requires capturing it from the sender and then assimilating it to the receiver. These processes rarely are synchronized as the success of both depends on the actions of individuals. The literature often recognizes the absorptive capacity of the receiver as the key factor of successful technology transfer. However, without the disseminative capacity of the sender, the actions cannot be executed. The disseminative capacity refers to the ability of tacit knowledge holders to form their know-how and expertise into a concept that is easily understood by others as well. This requires identification of transferable knowledge and the possessor of it. Thus, can be presented that with the absorptive capacity of the receiver, the disseminative capacity of the sender is equally important. If the knowledge cannot be successfully captured at the sender, the receiver will not be able to eventually put it into practice. (Malm et al. 2016.)

Chapter 2.3.2 defined the difference between explicit and tacit knowledge. If the aim is to transfer tacit knowledge, the assimilation of receiving organization or moreover individuals becomes severer. Therefore, the ability of personnel to learn from one another cannot be underestimated. Moreover, cultural differences in values should be taken into an account and at some level aimed to be decreased when applying appropriate interfaces. This can be executed through cross-cultural training, for instance. By this, the contextual differences can be brought to the awareness of the sender. (Argote & Miron-Spektor 2011, cited in Malm et al. 2016.)

In Chapter 2.4.3 the transfer of employees was categorized as its own entirety. Since the capability gaps frequently occur besides the transfer of tacit knowledge, these gaps could be mitigated by employees-transfer. Through this procedure, the personnel of the sender do not only provide training to the receiving organization, but they are associated permanently or temporarily part of a certain team or department. Due to the diversity of

the new organization, the competence of employees can be captured and shared more effectively as the procedure is supported by everyday interaction within individuals.

3. PREVIEW OF THE CASE COMPANY

The case company of the study is a Finnish enterprise that operates in the field of defense industry providing solutions for both local and international customer needs. Key competence areas of the company include armored wheeled vehicles and mortar systems along with their life-cycle support services.

3.1 Business environment

This Chapter defines the market structure and the characteristics of the business environment in which the case company is operating. Moreover, the chapter aims to represent the relation and factors of the micro environment and the macro environment with the aspects of political perspective. The chapter also gives a definition for the OCCAR (*Organisation Conjointe de Coopération en matière d'Arment i.e.*Organization for Joint Armament Cooperation) organization which has a meaningful role in this certain environment.

The business environment of the case company is an oligopoly as there are only a few competitors in the market offering similar products. Moreover, the business environment can be identified as differentiated oligopoly since the products are alike but not identical as they have slightly varying features depending on the producer. As Chapter 2.1.2 described, in a differentiated oligopoly, all actors have the same clientele to which they tempt to affect through their business plans and strategies. Factors such as complexities of high transaction costs, incomplete information and bounded rationality are typical features of this exchange setting. Differentiation of a company in such a business environment is not simple and thus the environment is characterized by barter, countertrade and offset contracts that occur as survival marketing strategies. (Taylor 2011.)

As Chapter 2.3.2 presented, in most countries, actions related to defense and military technology require special arrangements. Thus, in an oligopoly such as the market of the case company, the procurements are approved by the governments. Moreover, as any trade cannot take place without the involvement of a government, politics plays a meaningful role in the decision-making in both sending and receiving region. One key element related to competitive bidding is the nature of the procurement: off-the-shelf product versus the promotion of domestic production via technology transfer. Generally,

via technology transfer, a smaller operator such as the case company may have better chances against its larger competitors. Furthermore, the benefits for the receiver are economically attractive by technology transfer. In the market of the case company both off-to-shelf products and actions related to technology transfer transaction occur.

As presented in Chapter 2.1.1, micro elements of the business industry may be equal for firms operating in the same environment. In the surroundings of the case company, such elements of micro environment as competitors and customers are obviously defined identically for every organization. Like the case company, its competitors are government supported enterprises and the customers are governments of countries instead of private persons or companies. In Chapter 2.1.1, handling the factors of micro environment was defined to have a meaningful reflection on the success of a firm. The factors of micro environment related to the case company are visualized later in this chapter in Figure 3.1.

In Chapter 2.1.1, the macro environment was defined as a more distant environment of a company that consists of such factors as political and global aspects. This environment offers a framework in which a company and its micro environment are operating. Chapter 2.1.1 presented macro environment uncontrollable for a company and hence it produces difficultly manageable threats and opportunities. Capturing and processing of these phenomena do not follow a simple procedure and in many cases, they are not easily forecasted. Yet, though the macro environment remains uncontrollable, a company may aim to influence it through its business decisions. Unlike the modern business environment, the surroundings of the case company remain typically quite stable. However, when the environment confronts a massive change, it has an enormous and crippling impact on the whole industry. Almost without an exception, these changes are caused by political factors.

The forces governing the macro environment of the case company are local and global legislation and political decision making of the seller and the buyer. As Chapter 2.1.3 presented, policies indicate the attitude of the government to a certain type of business and industries. As previously mentioned, in this specific field of industry the trade between parties requires approval from the government. Thus, without an export permit, the company cannot transfer its products arbitrary outside the borders of its home region. This arrangement is caused by direct controls that were discussed in Chapter 2.1.3. Moreover, these controls are due to the export-import policies that were introduced as one of the four most important governmental policies (Chapter 2.1.3). Since the business

of the case company is constantly influenced by the political environment, changes in government policies may have a significant impact on the operation of the company. For instance, if the company does not obtain an export permit for a certain project, the trade between these two regions cannot be executed.

The combination of the micro environment and macro environment of the case company is presented below in Figure 3.1. The factors of the macro environment are based on the PESTEL framework which is generally used for the analyzation of these aspects (Pan et al. 2019).

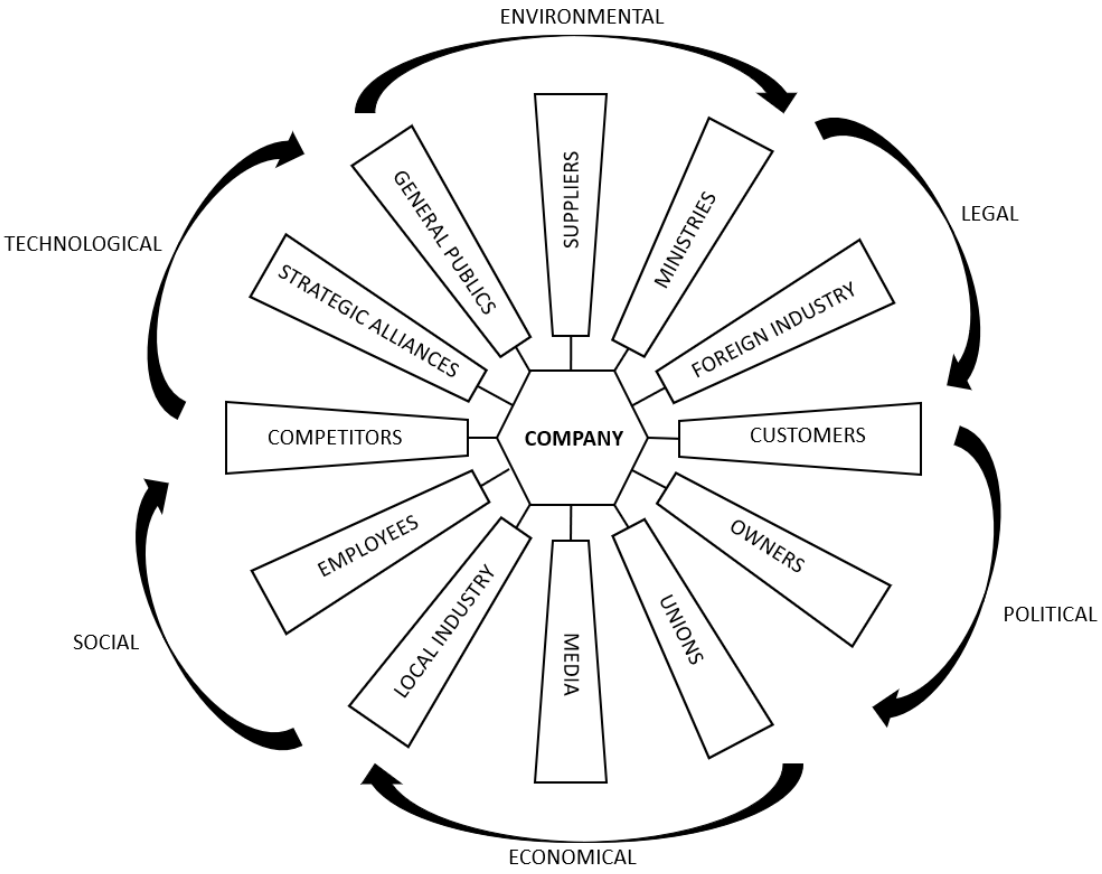

Figure 3.1. *Micro environment and macro environment of the case company.*

Figure 3.1 visualizes the difference between micro environment and the macro environment. The elements of micro environment reflect the everyday operation of the company since these are generated by nearby surroundings. As previously presented, the factors of macro environment form more distant surroundings for the operation of the company as well as the elements of its micro environment. Though the company cannot control the macro environment it can aim to affect some elements of it. Considering the operation

and business of the case company, the most relevant factors of the macro environment are political, legal and technological. Technological and legal aspects are more unequivocal to realize as they present the requirements and legislation for the product and the trade between the parties. Political perspective presents policies, political risks and political behavior. Literature review provided a definition and aspects for these in Chapters 2.1.3 and 2.2.

The case company has identified some of its potential customers as regions in which politics have a more meaningful role to procurements than in others. Especially in the case of these regions, the nature of procurement can have a significant impact on the decision of the customer. In Chapter 2.2, political processes are defined to have a relation to SDMP. In technology transfer, SDMP related aspects come from both inside and outside the organization. Via a competitive offering, the case company aims to affect the SDMP of the customer. On the other hand, the customer may choose the concept of the case company as it provides benefits for the receiving region and thus the trade can have an economically positive effect for the state in question. Due to this can be stated, that whether the individuals are working inside or outside an organization, they will be affected by the outcome of SDMP. Moreover, the decision-makers in the government aim to satisfy the interests of the region. (Chapter 2.2.)

Besides the impact of the political environment, Chapter 2.1.3 presented a definition of political risks. The chapter stated, that the impact for tension may come from both outsides or inside the government. Moreover, when the origin of challenges is outside the administration, they tend to have more visibility in our everyday life. However, for the operation of the case company the tensions inside governments are more relevant as they may retard the decision-making related to procurements. This is a factor of the macro environment which is uncontrollable for the company. Nevertheless, as Chapter 2.2 suggested, the political behavior considering SDMP can be forecasted by antecedent conditions. In this case, since the case company has aimed to determine the importance of politics in its potential customer regions, the company should be able to have aware-ness of risks related to competitive bidding in a certain state.

A factor of the micro environment that is relevant to the operation and business of the case company is the OCCAR. The OCCAR is an international organization that manages cooperative defense equipment programs through their lifecycle within the member states. Currently, the member states are Belgium, France, Germany, Italy and the United Kingdom. According to the OCCAR, its aim is to enable the member states to reach improved efficiency, decreased defense costs and maximize economic benefits. The foundation of the OCCAR is based on the open structure

that enables the management of several projects in different countries. Thus, any nation is allowed to join the OCCAR as long as they are part of the contribution to the overall effort, agree to the principles of the organization, allow the OCCAR without restraint to manage programs and be responsible for the selection of prime contractors, and represent no security risk to the organization. (OCCAR-EA 2019; Reda 1999.)

Since the origin nation of the case company is not a member-state of the OCCAR, the projects of the company do not gain support from this certain organization and hence they get less attention. For instance, if a member-state of the OCCAR is involved in competitive bidding, its product may be more influential due to the wide user base and the support of the prominent organization. However, there are some programs supported by the OCCAR which have been identified expensive for the receiver by the case company and thus, the case company may be able to reach competitiveness through its technology transfer related strategic actions. The difference between the procedures of the OCCAR and the case company can in the programs in question be explained by an aspect presented in Figure 2.3. If the procurement is executed via a program of the OCCAR, the trade could be described as Product A (Figure 2.3) that represents high costs with lesser level of consumer surplus. Via technology transfer procedure of the case company, the trade has characteristics of Product C or Product D with lower costs and higher consumer surplus. This aspect is discussed more in Chapter 5.5 based on the RBT.

3.2 Motives for technology transfer

This Chapter presents the motives of the case company for technology transfer. For this purpose, two aspects are identified: offset agreements and competitive advantage. Both are defined and discussed specifically in this chapter.

3.2.1 Offset

In defense industry, technology transfer has generally occurred due to offset agreements between nations. Offsets are produced by the counter-trade obligations that are required as a part of large defense procurement contracts (Won-Joon & Tae-Yun 2007). In offset agreement, the buyer is legitimate to benefit from certain activities performed by the seller (Ahlström 1991, cited in Malm et al. 2016). Defense offsets provide an opportunity for the buyer to build up defense strength by absorbing foreign defense core technolo-

gies. Furthermore, they help to increase employment in the receiving country as frequently the procurements lead to local manufacturing and maintenance capability. Politicians making the decisions aim to reach support for the procurements by highlighting the national benefits of it for the country. Thus, many of the offset activities are focused to boost the local industry in the receiving country. (Won-Joon & Tae-Yun 2007; Ahlström 2000, cited in Malm et al. 2016.) Obviously, this is the most effective when the transferable technology comes from more advanced countries.

There are two distinctive types of the offset program: direct and indirect (Won-Joon & Tae-Yun 2007). European Council Directive 2009/81/EC defines direct offsets as activities straightly linked to the main product to be procured. Thus, these offsets can also be referred to as military offsets due to their military-nature. Direct offsets may, for instance, occur through joint production. Indirect offsets may be limited to the military sphere or they can be non-military and thus these can also be referred to as civilian offsets. (Council Directive 2009/81/EC.) In case of some offset activities, there is not always a sharp difference between direct and indirect offset. Some activities may even belong in both categories case by case (Won-Joon & Tae-Yun 2007). Technology transfer is an example of this as it can be a direct or an indirect offset depending on the transferable object. As presented in Chapter 2.3.1, by technology transfer arrangements technology is transferred from its origin to the receiver operating in the same or a different field of industry. In this study, the technology transfer of the case company is related to direct offsets, among other motives.

However, Directive 2009/81/EC (Council Directive 2009/81/EC) presents that offsets can be seen violating for the basic rules and principles of primary EU Law and hence the Directive cannot permit them. According to primary EU Law, the Internal Market is based on the free movement of goods, persons, services and capital. Whether offsets are direct or indirect, the Directive presents that they preclude the basic principles of this law and thus, they are prohibited. (Council Directive 2009/81/EC.) The journal by Malm et al. (Ahlström 1991, cited in Malm et al. 2016) also argues that in many cases the purpose of the offset business is to establish long-term economic development for the buyer country. Thus, the nature of the offset business is not the same as the nature of the original international business.

However, the prohibition of offsets activities in EU area does not lead to the abandonment of technology transfer in defense industry as it is still strongly integrated into strategies of some nations. For instance, due to the offset agreement with Saab, Brazil has

adapted international technology transfer as an imperative part of its business strategy (Viera et al. 2014, cited in Malm et al. 2016). In addition to this, Directive 2009/81/EC does not repeal already existing offset agreements and it is only related to the trade in the EU area. Thus, offset agreements still occur among other regions.

Since the overall benefits of an offset agreement is not effortlessly calculated without a long observation period, this study focuses on the expected advantages of technology transfer offset. Hence the study does not present offset related calculations, but aspects of economic development.

3.2.2 Competitive advantage

The second motive for technology transfer is the desirable competitive advantage via benefits that the customer reaches through this procedure. This aspect is more relevant in this research and it occurs in varying fields of the industry whereas the offset agreements are characteristics of a certain business. Though the focus of the study is on an oligopoly, technology transfer as a phenomenon covers other market structures as well.

As Chapter 2.1.2 presented, a company operating in an oligopolistic market cannot gain a competitive advantage against others through traditional strategic planning. This is the case with the case company as well and hence the company offers its customers a chance for local manufacturing via technology transfer. In addition to this, the receiving party gets the maintenance competence and prowess of the products. As presented in Chapter 3.2.1, the increasing level of employment can be seen to have an economically positive effect. Due to this, it is reasoned to argue that technology transfer should be an efficient export strategy for the company. The execution of technology transfer can be identified as a strategic decision as by it the company aims to manage the external threats and opportunities of the business environment, as defined in Chapter 2.2. As presented in the same chapter, a decision can be highly strategic in one industry but not strategic at all in another. In this case, the decision can be stated as strategic since it is the core of the business in the case company. This aspect is discussed more in Chapter 5 with the analyzation of value-creation of technology transfer.

Chapter 2.2 also discussed political behavior related to strategic decision-making. In that chapter, two perspectives were identified and in this certain technology transfer, the aspects of the second category (i.e. the political behavior between organizational units that attempt to disturb SDMP) are relevant. This category was defined to consist of actors

from both inside and outside the organization. In the technology transfer of the case company, the internal actors create the decisions that aim to respond to the political behavior of external actors which are a character of macro environment. Previously presented offset agreements can be defined as external actors caused by government agencies that generate the requirements of the customer. Figure 3.1 visualized this aspect and one could argue that via strategic decisions of internal actors the company aims to give a response by which it can affect the political behavior of external parties. And as already previously presented (Chapter 2.2), the actors are tied together by the fact that the outcome of SDMP has an influence for both. Technology transfer can be argued to generate benefits for both parties and thus it should be seen in a positive sense.

In addition to the aspects presented above, as the case company has identified technology transfer as the core of its business as the produced products are always tailored to correspond to the requirements of a certain customer. In other words, via technology transfer, the customer gets a customized product instead of a standardized one. Furthermore, the company has aimed to determine the facilities to respond to this operation. Since the company has recognized itself as a pre-series and prototype manufacturer, neither its production facilities nor the organizational structure of human resources should correspond to the requirements of mass production. However, the optimization of these characteristics does not alone guarantee effective operation, as the organizational processes should also be shaped to respond to the operative functioning. Since the company focuses on the small series production, the everyday operation should be both flexible and efficient at the same time. In Chapter 5, the more detailed presentation for this is to be discussed.

As Chapter 2.1.1 presented, the business decision of a company is often influenced by both internal and external environment. The external environment of the case company was identified as an oligopoly and was handled more specifically in Chapter 3.1.1. Chapter 2.1.1 presented such factors as facilities, technological capabilities, marketing resources, financial policies and human resources as parts of the internal aspect of an organization. Some of these aspects were already previously discussed, but skillful personnel can be defined as the key factor of technology transfer. Without the ability and competence to train foreign employees in the receiving region, the case company could not implement the transfer of technology. Though in this certain field of business the offset agreements may demand a certain amount to be executed by the local industry, the efficacy in this operation cannot be reached without the know-how of personnel.

As a conclusion can be presented, that via technology transfer the case company aims to underline two positive aspects for the receiver. Firstly, through this procedure, the trade between the parties can be seen to have a positive effect to the employment of the receiving location. Secondly, via technology transfer, the receiving party reaches competence for independent operation. This does not only cover the capability to produce the products, but it offers the prowess for maintenance and further business opportunities. One can argue, that the second aspect is the most valued for the customer since by reaching the certain competence level, the receiver has the ability to operate independently.

3.3 Channels and methods of technology transfer

As previously identified, the knowledge of personnel has a meaningful role when the technology is transferred from the case company to foreign receivers. Thus, along with the technology to be transferred, the case company aims to provide the related know-how to the receiving region. Through this, the receiver has an opportunity to reach competence for individual operation. Technology transfer of the case company has transferable objects from all the four categories (material-transfer, design-transfer, capacity-transfer and employees-transfer) defined in Chapter 2.3.3. Thus, the company has variable methods for the transfer of these elements. Transferable objects will be defined and analyzed more specifically in Chapter 5.

As Chapter 2.3.3 presented, technology transfer can be executed through a wide array of channels. The main channel for the transfer of technology between the case company and the receiver is licensing as all regarded operation is based on these agreements. Since the projects generally contain life cycle support and maintenance services, these may require additional export licenses too (Website of the case company 2019). In case of any licensing agreement related to the transfer of technology, the case company has a role as the licensor while the receiving party is referred to as the licensee. The receiver of the technology is not the same as the end user of the product since the manufacturing is executed by a local producer while the customer is a government. Thus, since the receiver of the technology is the manufacturer, the same party also represents the role of the licensee. By licensing agreement, the case company provides permission for local production and maintenance to the licensee for a predefined period. The duration of the agreement varies case by case and since the production phase and maintenance phase may require differing agreements, the duration may not be identical for both. Moreover,

though the licensee gains a prowess for local operation through the agreement, product rights are held by the case company.

If technology transfer is executed through licensing, Chapter 2.3.3 presented that this requires the involvement of other channels as well. Table 2.1 presented through which channel a certain type of transfer can be executed. At the beginning of this chapter it is stated that technology transfer procedure of the case company has elements from all the four categories presented in Chapter 2.3.3 and due to this, besides the licensing the transfer requires the involvement of other channels. These channels could better be referred to as methods since they have a role of supporting actions while the arrangement between the case company and the customer is based on the licensing agreement.

In Chapter 3.2.2 the competence of independent operation is stated as the most desirable result of technology transfer from the customer point of view. This competence is captured through the transfer of know-how and especially tacit knowledge. As a channel for the transfer of knowledge, Chapter 2.3.3 defined the cross-border movement of personnel. Since the receiver of technology must also have the prowess to use it effectively, besides the transfer of hard technology the complementary services are provided by personnel.

Strategic alliances are another channel relevant to the technology transfer of the case company. These alliances may be the suppliers of the company or previous receivers of the technology transfer. The role of these, as well as the movement of personnel, is discussed more in Chapter 5 besides the analyzation of value-creation for different parties.

4. RESEARCH ASPECT AND METHODS

This Chapter defines the research aspect and methods that are used for the collection of data.

4.1 Definition of the research aspects

The research object of this study is value-creation of technology transfer which is executed by a certain Finnish company (Chapter 3). Though technology transfer refers to the action between the sender and the receiver, third parties can be involved in the operation as well. Thus, three research aspects are defined: value-creation for the sending region (focusing on the case company), value-creation for the receiving region and value-creation for third regions. The main interest of this study is in the first and the second aspect as the case company can through these aim to reach a competitive advantage in the market. Since all defined aspects are affected by political behavior this perspective is discussed in connection with the value-creation.

As Chapter 2.1.1 presented, business decisions of a company are made in the internal environment and their effectiveness cannot be comprehensively forecasted before the actual action towards the external environment. However, in many cases, success can only be identified after a longer period of time. Thus, though this study aims to define the business environment of the case company and moreover argue how the value-creation of technology transfer occurs in such surroundings, the results are not based on any certain case. Due to this, the results of the study will not contain observations from the forthcoming practical point of view. In the research, all official information regarding the technology transfer is based on the previous projects of the case company.

4.2 Company strategic landscape (CSL)

This Chapter presents the definition for CSL framework which is the main research method in this study. The purpose of the framework is to provide a comprehensive visualization of technology transfer executed by the case company. This illustration does not only identify the elements of technology transfer itself, but it presents all the other operations related to this arrangement in the company. In addition, the framework aims to show the relation between these components.

4.2.1 Background and description

Company Strategic Landscape (CSL) is a framework used to describe the key elements related to product development and thus product structuring. The purpose of the framework is to present the related business operations as an entity considering product development. (Birkhofer 2011, p. 141-142.) The effectiveness of the CSL framework is based on its helicopter view by which detailed sections can be observed at the same time. This helps to generate an overall view of the business. However, it is meant to notice, that by the CSL the empirical measurements of business cannot be reached since it is only a visualization that gathers together the views presented by personnel of a company. (Lehtonen 2019.) According to Lehtonen (2019), the CSL has been utilized successfully in dozens of development projects and hence, its usefulness has been verified concretely.

According to Lehtonen (2007, p. 97), the structure of a product cannot be defined separately from other operations. The CSL concretely shows the relation and interaction between separated business elements. Moreover, the framework does not only define the supportive actions of operation, but it also defines the possibilities and the guidance through which one element can affect another. The general structure of CSL framework is presented below in Figure 4.1.

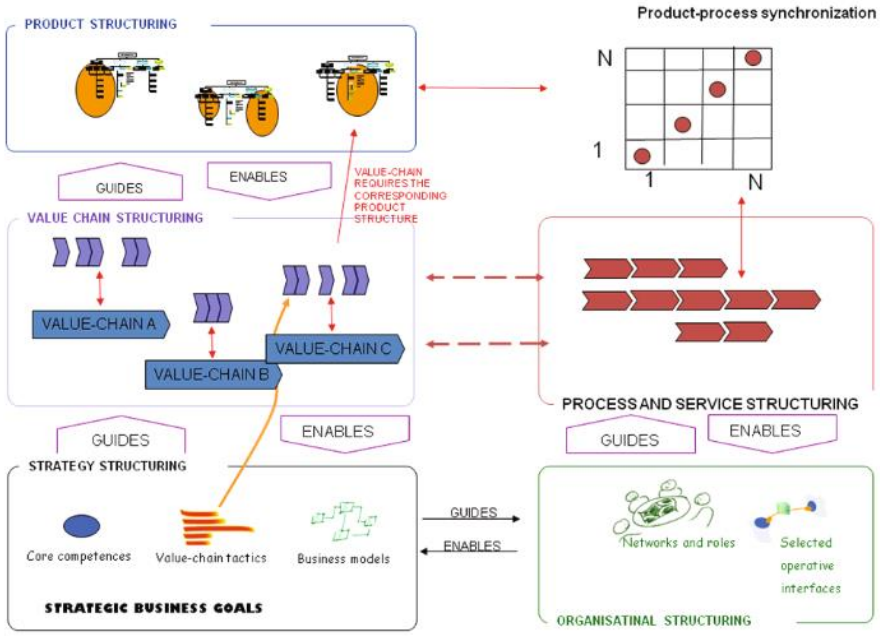

Figure 4.1. *Company strategic landscape, adapted from (Lehtonen 2007, p. 97).*

The core of the framework, product structuring, is on the top left (Figure 4.1). In this context, the product structure does not refer to the manufacturing structure and thus it does not consist of a list of parts to be assembled. In the CSL framework, the structure of the value chain is presented in the middle on the left-hand side (Figure 4.1). Value chain structuring and product structuring can be seen to interact with each other. Value chain structuring is enabled by product structuring and it is the structure in which the product is expected to operate. In addition to this, the structure of the value chain guides the structure of the product. On the other hand, the structuring of the product forms the requirements for the value chain structure. (Birkhofer 2011, p. 141-142.)

The value chain structure is defined by the structure of the business strategy which is presented below the value chains (Figure 4.1). The strategy determines a long-term direction of the business and thus it sets the requirements for value chains when the aim is to reach a competitive advantage. In the CSL (in the middle on the right-hand side) are presented the related processes of products and services (Figure 4.1) such as sales, design and production. These processes are operated by the organizational structuring which is presented on the bottom right (Figure 4.1). These can be seen as internal resources and network of the company that consists of selected methods and practices too. (Birkhofer 2011, p. 142.)

By exploiting the CSL framework, the internal structure of the product and the delivery process can be linked to each other. Thus, these two processes can be examined at the same time instead of selecting and defining them separately from each other. The relation between the structure of the product and the delivery process is described by the points on the top right in Figure 4.1. The points demonstrate effective combinations of the operations in which actions are sensibly executed and thus through these, the selected goal can be reached. The diagonal line in Figure 4.1 is merely an illustration describing the placements of the points. However, this vector form is not necessarily the desirable form and, in some cases, the effective points for the operation may not exist at all. (Lehtonen 2007, p. 98.) Lehtonen (2007, p. 205), has proposed that the value-creation of the CSL can only be identified by its usability. Therefore, his research presents eight industrial examples of the usefulness of the CSL when discussing issues that have been identified in practices.

4.2.2 The utilization of CSL

Commonly, the CSL framework has offered a base for modularity of a product which is then designed by further processing. In the case of modularity, the formation of the CSL leads to the definition of product structuring principles (PSP). (Lehtonen 2019.) Yet, the framework can be exploited to other applications as well. In this study, the aim is not to generate a modular structure of the product but to identify the value-creation for three parties (the sending region, the receiving region and third regions). Moreover, when the value-creation is discussed based on the CSL map, the relation of other elements can be observed from the perspective of value chain structuring.

Lehtonen (2019) presents, that frequently the compilation of CSL is executed in workshops that have a representative from all stakeholders. Through this procedure, the common visualization of business and product structuring can be reached. Furthermore, personnel may own different approaches and various viewpoints to issues and problems in hand, and thus the participation of personnel may generate new information and shared knowledge and visions among the participants.

5. ACTIVITIES

5.1 Definition of the future vision

The case company has identified technology transfer as the core of its current strategy and thus, the sections of strategy support this action. The future vision of the company defines that international projects are executed felicitously and nimbly via technology transfer arrangements. This requires the formation of competitive offerings by which the company can stabilize its position in competitive bidding and reach new customers. Technology transfer is a major part of this as the settlement of this concept enables to vary the offering case by case with the aim to provide the most efficient solution for the customer.

5.2 Formation of the CSL map

The formation of the CSL map represents the stage of data collection in case study. The CSL map is formed with the help of technology transfer specialists of the case company. As Chapter 4.1.1 presented, the CSL framework aims to visualize the product structuring and the related business operations as an entity. Thus, the framework does not only cover the elements but the relation between them as well. At this point in the study, every element of the CSL map is shaped separately without taking into notice the limitations or deficiencies between them. This approach enables us to view how technology transfer is currently executed by the case company.

In this study, the ambition is to identify the value-creating activities and elements of technology transfer as these are the components by which the company aims to influence its customers. By expected value-creation, the competitiveness of the product can be concretized to customers. Therefore, when the CSL map is analyzed the focus is on value chain structuring. Since technology transfer does not provide advantages merely to the sender and the receiver, Chapter 1.2 defined three aspects for the observation of the CSL: the sending region, the receiving region and third regions. All of these are presented in the CSL map and discussed later.

The CSL map is presented in the Appendix 1. This map is the comprehensive visualization of the concept of technology transfer of the case company. Via this, we can discuss

the value-creation via other elements. Additionally, the map builds a base for further processing of this procedure. The CSL map contains a wide array of processes and set-ups related to technology transfer and thus, these are presented in outline without going into a more detailed description.

5.3 Identification of value-creation in technology transfer

The main aim of this Chapter is to discuss the value that is generated and captured through the transfer of technology. As defined in Chapter 5.2, the CSL map is analyzed focusing on the aspects of value-creation. In addition to the observation of the current procedure, the study strives to identify developing areas by which the operation could be improved. Due to this, all values presented in CSL map are viewed in the light of processes of the case company.

The aspects presented in Chapters 5.3.3, 5.3.4 and 5.3.5 are notions of the researcher in this study and hence they provide a suggestion how the CSL map could be utilized when analyzing the value-creation.

5.3.1 Preview of the value chain structuring in CSL map

In CSL map, each of the previously identified perspectives has various aspects in them. From the perspective of the sending region, three aspects can be identified: the case company, industry and the owners of the case company. In this case, the industry refers to suppliers of the company in the original region of technology. Since the case company is not a public limited company, the owners are not individual stockholders but the origin country of the case company and foreign concern.

In the receiving region, the three aspects are the state (the customer), the manufacturer and local industry. At this point is important to notice that the main receiver of technology is not the customer since the products are manufactured by a local company. Thus, the manufacturer is the one that absorbs the knowledge offered by the case company. The set-up is similar in the sending region: a state-owned enterprise produces the products, but the customer is the government. The third aspect, local industry, is characterized by the suppliers and subcontractors in the receiving region.

The third perspective that is presented are the third regions that may be involved in the trade of technology. This perspective consists of two aspects: the industry and the government. Generally, these are regions the case company has previously executed technology transfer to and hence they should have the prowess and competence for independent manufacturing. Thus, the regions that previously were receivers of technology may now have a role as strategic alliances. This activity may purely be based on their developed level of know-how, but it may also be due to the offset requirements. In the latter case, the offset agreement generally demands a certain amount of profit for the country in a certain field of industry.

As Chapter 4.1.1 presented, the value chain structuring is interacting with the structure of the product. On the other hand, value chains have a relation to strategy structuring and the structure of processes and services (which are guided by organizational structuring). Hence, it is meaningful to observe the value chain structuring assimilated to other elements of CSL. By doing this, one can see the origin of each value and thus, possible limitations and grievances between the varying operations can be recognized. For the evaluation of value-creation in this study, there are three main perspectives to be defined: the case company, receiving region (customer, manufacturer and industry) and third regions (industry and state). As the structure of the product is generally the output of the CSL map, this is not discussed with the analyzation of the value-creation. In the optimal scenario, the value-creation could be improved by some minor modifications to the practices. The development areas that are identified via the analyzation of the CSL map are presented in the conclusions since they are not included in the scope of this study.

5.3.2 Evaluation of value-creation for the case company

In this section, the CSL map is reviewed from the aspect of the case company (Appendix 2). The aim is to visualize and concretize the interaction of value-creation and other elements of the CSL. The other elements of the CSL map are factors that may generate, enable or guide the value (Figure 4.1.). In addition, the added value may be detected and concretized inside these elements.

The first identified value-creating element for the case company is vantage gained via technology transfer in competitive bidding. Competitive advantage is the aim of every company, but it cannot necessarily be gained by everyone since it is not effortlessly

reached. As Figure 4.1 presented, the value chain structuring is guided by strategy structuring in CSL map. If we look at the map presented in Appendix 2, the base of competitive advantage is the competitive product defined in strategy structuring. However, since the case company is operating in very specified oligopoly, the high-tech product alone does not guarantee success in the market. Due to this, as presented in strategy structuring, the company aims to fulfil the customer needs by flexible and customized solutions as presented in strategy structuring. The purpose of these solutions is to respond to customer needs through both product development and technology transfer. In addition to the positive effect on competence and prowess, the technology transfer has a favorable political and economic impact on the countries involved in it, as well. Hence, we can state, that flexible and customized solutions are the strategic elements that guide competitive advantage in value-chain structuring.

In Figure 4.1 is presented, that the value chain structuring enables the implementation of the strategy. In other words, the value chain structuring is a concrete action by which the strategy is executed. Nevertheless, the strategy itself does not implement nor execute itself since these actions occur through certain behavior of employees of the company. Therefore, if the aim is to reach success in competitive bidding which leads to a profitable business, the value-creation needs to be concretized to the customer. This requirement is taken into account in the sales and marketing process and means for it are given by organizational structuring. As the agreement accepted by the customer concretizes the value creation in the sales and marketing process it is highlighted in the CSL map. This agreement is due to the portrayal of value to the customer which is discussed more specifically in Chapter 5.3.4.

The second value-creating element, internationalization, is highly appreciated in the current globalized business industry. In our CSL map (Appendix 2), pre-series manufacturing is the base for internationalization as it is the action that leads to cross-border operations. However, the key element by which internationalization is guided in the strategy structuring is technical know-how. The CSL map (Appendix 2) presents, that internationalization ensues through ecosystemic competence transfer by which strategic alliances are created. If the allies have the competence to manufacture or maintain the products, they may have a significant role not only in production but also in after-sales processes. In both cases, these allies generally present regions and enterprises to which the case company has previously executed the transfer of technology. In the after-sales process, the allies may provide their maintenance skills while the training is executed by the transfer at the receiver. Additionally, the facilities of allies can be utilized in this stage as well.

Due to previously identified aspects, the value-creation for the case company gained via internationalization is presented in the phase of facilities and training in the after-sales process. Internationalization with ecosystemic competence transfer gives the technology of the case company to reach for the other parties, as well. This action may, for instance, lead new technologies or mode of operation in reach.

In CSL map (Appendix 2), the third value-creating element for the case company and its production process are strategic alliances that generate global cooperation. As previously mentioned, these alliances may have developed competence to produce the products and hence their facilities can be utilized in the phase of pre-series. However, the alliance does not refer only to the previous receivers of technology since the case company can also modify its utilization of suppliers in the production process. Thus, the value of global cooperation can be identified in phases of production ramp-up and series as well. In the case of local alliances (suppliers), the pre-series could be nimbly produced since the operation is well-organized and efficient due to the optimized supply chain. On the other hand, if prospective foreign suppliers are used already in the production of pre-series, the ramp-up phase at the receiver could be carried out with less effort. Moreover, this prepares and facilitates the forthcoming series-production.

The CSL map (Appendix 2) also presents that strategic alliances may have a role in the change management process of the case company. As a result of this, the company offers customers engineering change proposals (ECP) by which the data can be updated. The identification of change requirements can also present concretized value-creation for the case company since these can be captured from the receiver of technology and thus the requirements may be valuable for other projects. The identification of change requirements leads to the formation of ECP which updates the data of the case company and hence presents the phase of concretized value-creation.

Due to the aspects presented above, the value generated by strategic alliances is the one that enables the element of pre-series manufacturing in the structure of the strategy. Moreover, for the most efficient results, global cooperation is the element that executes this certain element of the strategy structuring. The decision considering the possible operation via alliances in a phase of the process is guided by a project in organizational structuring. Since this choice keeps inside quite an array of alternative options depending on the circumstances, there may not be one solution which provides the most optimal

result in all forthcoming projects. Thus, the measures are arranged case-by-case which requires agility and situational awareness from the case company.

The fourth element generating value for the case company is infrastructure development and prowess. This element is guided by technical know-how in the strategy structuring and it is executed via ecosystemic competence transfer in both technology transfer processes. In the digital transfer process, two stages are the most relevant: formation of the data package and transfer of them via Extranet. Both stages represent the utilization of digitalization and thus, they provide a chance to avoid manual work by which the level of possibilities to errors increase. Furthermore, when the transfer is executed through encrypted packages via Extranet, all the information is collected in one place and hence in reach for both parties (the case company and the receiver). Thus, both parties have evidence that all the necessary data is transferred. In the transfer of know-how, all the three stages concretize the value-creation as they demonstrate that the case company is, as previously mentioned, certified to train the customers of its origin nation too. On the other hand, these stages provide a chance to the case company to improve the training methods and thus, new aspects can be reached from the receiver.

5.3.3 Evaluation of value-creation for the receiver

For this stage of the study, the CSL map is modified to present the aspect of a receiving region. The aim of this is to provide a conceptualized illustration of how the value-chain structuring of the receiver is affected by the processes of the case company. Via this, the possible development areas in processes can be identified which is important as the case company states that its operation is customer oriented. The modified CSL map is presented in Appendix 3 of this study. In this chapter, the value-creation to the receiver is discussed and rationalized by strategy structuring and process structuring of the case company. As Chapter 5.3.3 presented, all the processes are guided by projects in organizational structuring. Due to this, the efficient transfer of technology requires the same strategy structuring at the receiver. In other words, this structure should be characterized by projects and sub-projects.

For the receiving region, the first identified value-creating element is employment that occurs in all the three aspects (state, manufacturer and industry). By remembering the content of Figure 4.1, we can state that this value-creation is guided by flexible and customized solutions in strategy structuring of the case company. If an off-to-shelf product was offered instead of a concept of technology transfer, the trade would not have benefits

affecting the employment level at the receiving region. If we look at the process structuring of the case company, we notice that positive effect to the local economy is concretized to the state and the manufacturer in sales and marketing process and phases of production via increased employment level.

In sales and marketing, there are three phases to be highlighted. The first is marketing by which the case company can raise the interest of the customer in the concept of technology transfer. At this phase, it is visualized that by using the option of technology transfer the receiving region (customer) can buy a project instead of a physical product. In the second highlighted phase, the impact of the offer on the value-creation of employment is concretized for the first time. At this point, one could question if an offer provides value to the customer since it is not a matter whereof they are prepared to pay for. Nevertheless, in the case of technology transfer, an offer with clear competitive advantages to the customer, as well, is the one that illustrates the benefits for the receiving region for the first time. Due to this, the offer can help to maintain the interest of the customer to the concept of the case company. Finally, the value of employment is officially shown in the last stage of the sales and marketing process which is the accepted agreement. This guarantees that the customer is legitimate to obtain the agreed concept that consists of a certain amount of local manufacturing.

In the production process, three core phases are highlighted. The first one is the stage of pre-series which is carried out outside the borders of the receiving region. Training to the employees of the manufacturer is provided along with the pre-series. Thus, this is the phase that builds a base for the prowess of local manufacturing. In the stage of pre-series, the identified value-creation of increasing employment level in the receiving region is more relevant to the suppliers. In CSL map, this refers to the foreign industry which is identified as the third aspect of receiving region. As presented in Chapter 5.3.3, the suppliers from the receiving region could already be utilized while producing the pre-series which helps to verify their suitability to further series-production. Additionally, this generates global customerships which are identified as the second value-creating element for the industry of receiving region. Through global customerships, the industry benefits from the internationalization which is identified as the third value-creating factor for this party.

The subsequent phases of the production process are the ones in which the increased employment level is created both in the manufacturer and foreign industry. First of these stages is production ramp-up which eventually leads to the stage of series-production

that is highlighted as another stage of benefits gained by the value-creation. Since the customers of the case company are states, the value-creation of increasing employment level occurs to them both via the aspects of manufacturer and industry.

The right to reach advanced technology is identified as the second value-creating element for the receiving region. In the CSL map, the advanced technology is counted as a benefit for the state and the manufacturer. Furthermore, it is presented that this is guided by the combination of two elements in strategy structuring: flexible and customized solutions and technical know-how. First of these is the one that sets the requirements for the technology which is then executed by the second identified element. Advanced technology is captured via ecosystemic competence transfer, and technology transfer change management are the processes in which it is concretized. In both cases, the aim of advanced technology is to provide qualifications for manufacturing.

In CSL map, the technology transfer process is separated into two sub-processes that present the digital transfer and the transfer of knowledge. The purpose of these processes is to transfer differing concepts of technology. As presented in Figure 2.4, technology is a combination of a hard and soft element. The aim of digital transfer is to provide the elements of hard technology (product technology and process technology). The value-creation of these elements is presented to be concretized when they are implemented into the systems of the receiver. The transfer of know-how aims to ensure that the receiver will capture the soft technology which is related to the product. Figure 2.4 presented soft technology as a combination of explicit knowledge and tacit knowledge. The definition for these elements is presented in Chapter 2.3.2 and additionally, Figure 2.3 visualized the common distribution of knowledge. Moreover, tacit knowledge is presented as the key-factor for organizational learning and economic competitiveness. The chapter also presented that via the comprehensive transfer of tacit knowledge the manufacturing technology is often more effectively transferred and captured by the receiving party. Due to this, we can argue that the receiver reaches the utilization of advanced technology via training and coaching which occurs in all the phases of know-how transfer.

In the change management process, the implementation phase is the element that materializes the value-creation of advanced technology to the receiver. This process ensures that the manufacturer has data which is up-to-date and hence enables efficient manufacturing.

The third value-creating element for the customer (the state) is the customized product guided by flexible and customized solutions in strategy structuring. The value-creation of this element is first time observed in the sales and marketing process in which the visualization of customer requirements is presented. After this, the requirements are taken into account in the production. As a result of the production, the requirements are eventually concretized in practice i.e. the customer receives the physical product that presents a certain customized solution. Simultaneously the third value-creating element for the manufacturer (income) is concretized if the final payment of the contract is reached when products are delivered. Generally, in the projects in question the size of the projects is significant and thus, the manufacturer first gets a certain quantity of payment based on the terms of the contract and, the final post of the total amount is paid at the end of the project.

In CSL map, maintenance prowess is identified as the fourth value-creating element for the state and the manufacturer. In Chapter 3.2.2 this aspect is argued as the most valuable to the receiving party as through the certain competence level (maintenance prowess), the receiver reaches the potential for independent operation. The transfer of soft technology (technical know-how) via ecosystemic competence transfer is the element in strategy structuring that guides the capturing of maintenance prowess. In CSL map, the maintenance prowess is linked to three processes: sales and marketing, technology transfer (know-how) and after sales. This aims to visualize how the concept of independent operation is first absorbed by the customer in the phase of marketing. This outlines the vision of the region which is not dependent on the others. However, the competence which leads to the reach of maintenance prowess is concretized and captured in technology transfer and after-sales processes that provide all the necessary training and support.

By reaching the maintenance prowess and moreover competence for independent operation, the manufacturer additionally gains the fifth value-creating element which is business opportunities. These opportunities may be projects that the manufacturer has reached independently, or the facilities and competence of the manufacturer can be utilized in the forthcoming business of the case company. In this case, the manufacturer has a role of strategic alliance for the case company (Chapter 5.3.3). Thus, in that certain project, the manufacturer would have the role of industry in third regions of CSL map (Appendix 1). Through this, both the manufacturer and the state (Appendix 2) would gain benefits identified to third parties (Appendix 1). If we go back to the first discussed aspect

(business opportunities), we can detect that via further business the customer (state) also gains the fifth value-creating element which is fiscal income.

The final identified value-creating element to the receiving region is infrastructure development and prowess which also is due to ecosystemic competence transfer. This element benefits all the three parties: state, manufacturer and industry. However, in CSL map this aspect is not unambiguously concretized since as presented in Chapter 3.2.1, the overall benefits of such an arrangement (economic development via technology transfer) are not effortlessly realistically calculated. This is due to the long duration of such projects and difficulties to distinguish benefits caused by technology transfer from economic development that has occurred or will occur for other reasons. However, the case company may aim to illustrate the advantages to the customer in the sales and marketing process by using varying scenarios. Moreover, as the facilities of the receiver are formed to respond to the requirements of production, it is presented that in production processes the value-creation of infrastructure development and prowess is concretized or rather the base for it is built.

5.3.4 Evaluation of value-creation for third regions

For this stage of the study, the CSL map is modified to illustrate the aspect of third regions. This map is presented in Appendix 4. Third regions are defined as the previous receivers of technology transfer and they may have a role as a strategic alliance for the case company. The modified CSL map aims to visualize the role of these parties in technology transfer related processes. Moreover, by this, we can detect how the role of the receiver may in the future turn to be the role of a third region via a certain level of competence.

The first identified value-creating element for third regions is increased employment level which is due to flexible and customized solutions of the case company (strategy structuring). In CSL map (Appendix 4), this value is presented as a source of positive effect to the local economy and it is concretized in three stages of the production process. The first of these, pre-series/training, can be carried out at the premises of and in co-operation with the ex-receiver of technology transfer as due to previous production co-operation they may have well-organized facilities and skilled employees for it. Furthermore, the capability gaps may be minor between the receiver and the third region compared to the situation between the receiver and the case company. An aspect for these gaps was presented in Chapter 2.3.4 and in this case, advantages may be reached via third regions

if their geographical location is favorable for the receiver of the technology. On the other hand, third regions can also provide some components and thus have a role as a supplier. In this case, the value materializes when these commodities are utilized in the production and due to this, the benefits can occur in the stages of production ramp-up and series as well.

The second value-creating element for third regions (industry) is global customerships and internationalization which is also guided by flexible and customized solutions in strategy structuring of the case company. As was the case with the increased employment, this value is presented to concretize in three stages of the production process (pre-series/training, production ramp-up and series) as the third regions may have a role in all of them.

For the industry of the third regions, business opportunities are identified as the third value-creating element. The gained business opportunities are due to the technical know-how of the case company (strategy structuring) which is shared through ecosystemic competence transfer. In Chapter 2.3.4 the requirement for the transfer of knowledge is defined as the ability to capture it from the sender and then assimilating it to the receiver. The key-factor for the successful transfer linked to this is the absorptive capacity of the receiver. In the light of these aspects we can state, that if the receiver succeeds to absorb the knowledge, they gain the ability for independent operation and thus may have the role of strategic alliance for the case company. In the processes of the case company, the business opportunities of third regions can be seen concretized in production, transfer of know-how and after sales.

As previously presented, the facilities of third regions can well be utilized in the case of pre-series/training. Moreover, since the first stage of know-how transfer is executed at the same time, third parties may be involved in this phase as well. Via this procedure, the capability gaps (Chapter 2.3.4) may yet again be avoided if the receiver and the third region do not differ culturally as much as the receiver and the case company. Thus, in the after-sales process, the third parties could also have a role in the transfer of the soft technology i.e. in the stages of training and support. In addition to this, their facilities can be used for the maintenance of the products.

Chapter 3.2.1 gave a definition to offset agreements through which the employment level of the receiving country is demanded to increase. Thus, we can state that the first value-creating element (employment) of third parties may be due to these agreements, but the

third element (business opportunities) is reached through a certain competence level. The latter case is the one more desirable for the receivers of technology as through this they will reach a prowess also for independent operation.

All the three previously presented value-creating elements are generating income to both aspects in third regions, industry and the state. For the state, the developed local industry generates more fiscal income and also reduces the possible un-employment compensations paid by the state. For the industry, the income comes from further projects to the companies received by increased competence gained through technology transfer.

The final identified value-creating element for the third regions is the development of infrastructure and prowess. One can argue, that this is the most valuable of all the elements as this prepares and enables the region for independent operation. The base for this element is the technical know-how of the case company and it is reached through ecosystemic competence transfer. If we look at the process structuring, we can state that this value is gained in the change management process by which the data is kept up-to-date. Thus, the stages of identification of change requirements and implementation of them at the receiver are the ones that generate this value.

5.4 Preview of product structuring

As Figure 4.1 shows, the structures of value chains are enabled by product structuring. Since the structure of the product illustrates the commodity offered to the customer, this element can be referred to as the essence of CSL map. As Chapter 4.1.1 presented, in CSL map product structuring does not refer to the manufacturing content of a product and thus it does not consist of the bill of materials. In this case, the product structuring represents the elements of technology transfer offered to the customer. The product structure consists of three main elements: Technical Support, Data Packages and Goods Deliveries. This Chapter aims to explain how these elements enable a specific value-creating factor.

Technical support covers the training through various phases of the product life-cycle starting from the pre-series and continuing all the way to after sales. Training represents the part of capacity-transfer by which the case company aims to ensure that the receiver reaches an overall competence to manufacture and maintain the products. If we observe the six concepts of technology presented in Chapter 2.3.2, we notice that training consists of both hard and soft technology. More specifically, technologies included in this

element are explicit product technology and tacit knowledge. Product technology and explicit knowledge are more unambiguously looked over but as Chapter 2.3.2 presents, tacit knowledge is more complicate to verbalize in both written form and verbally. Furthermore, almost without an exception, tacit knowledge cannot be transferred without face-to-face interaction. Thus, technical support is required especially when the manufacturing of pre-series and the ramp-up of local manufacturing are executed.

One could argue, that the most important achievement and ambition of the training is the transfer of tacit knowledge. As presented in Chapter 2.3.2, the comprehensive transfer of this knowledge often guarantees the efficient transfer of manufacturing technology as well. This does not mean that all tacit knowledge of the sender should be captured and then transferred but the receiver needs enough base from which to develop own know-how. Without the transfer of tacit knowledge, higher levels of competence cannot be reached at the receiver and hence the maintenance prowess remains inaccessible as well. In value-chain structuring, this means that advantages such as global cooperation via alliances (the case company), maintenance prowess (owners, customer and manufacturer) and further business opportunities (manufacturer) do not have a chance to be concretized in full or to be extend needed.

Data packages present hard technology in its rawest form and they consist of product technology and process technology. Both technologies are included in manufacturing data which keeps inside all the technical information of the product. Changes in these technologies are delivered to the receiver through change packages consisting of engineering change proposals (ECP). In the classification of technology transfer (Chapter 2.3.3), both data packages include design-transfer. Content of these packages is the draft of the product which later can be processed into a physical commodity through the know-how generated by the training. Design-transfer does not only offer the base for the activities related to manufacturing, but it also represents the material evidence of implemented transfer.

The third element of product structuring represent the critical components of the product that the receiver engages to purchase from the sender. These components and their quantity are defined beforehand in the licensing agreement. Goods deliveries can be categorized as material-transfer (Chapter 2.3.3) and they present process technology (Chapter 2.3.2) as they are components required for the production and development of goods and services. The delivery of these components can also be executed via a joint venture in the receiving region. In this case, in addition to previously identified channels

of technology transfer (Chapter 3.3), a joint venture would represent a new transfer channel.

As previously stated, the product structuring is enabling value-chain structuring in CSL map. If the structure of the product was an off-to-shelf solution instead of technology transfer, an array of elements in value-chain structuring of the three identified aspects would not occur. In that case, the trade would be characterized as the traditional operation between the seller and the buyer instead of a modern ecosystemic interaction which has an influence on third regions as well. Moreover, without this certain product structuring, the receiver of the technology would be able to reach neither the developed competence level nor the prowess for independent operation.

5.5 Evaluation of technology transfer by the RBT

In this Chapter, the technology transfer concept of the case company is evaluated in the light of the RBT which is presented in Chapter 2.3. Besides the RBT, Chapter 2.3 discussed the three aspects for the value of a resource and the technology transfer procedure of the case company is looked over by these. Moreover, a concretized aspect for the value-creation from the perspective of the receiver is discussed and presented in Appendix 5 of this study. The base for this is formed in Chapter 2.3 with the aspects of exchange value and use value, and by the definition of total monetary value.

In Chapter 2.3, the first aspect for the value of a resource is defined as follows:

“A resource can be seen valuable if it has the prowess to interact and utilize the factors of the business environment.”

In other words, this is stated as the capability to capture the opportunities and avoid the threats generated by the environment. In Chapter 3.1, the business environment of the case company is defined as a differentiated oligopoly which is characterized by political behavior related to SDMP. Figure 3.1 visualized the micro environment and the macro environment of the company and presented the political perspective as an element of the more distant surroundings (macro environment). This perspective is defined to represent policies, political risks and political behavior. As previously stated, SDMP of the customer is characterized by political behavior and thus, the receiving region will most likely choose an offering through which both economical benefits and the high-quality product, can be reached. As presented in Chapter 3.1, some potential customers of the

case company have been identified as regions where the current political situation is more relevant considering the SDMP. Especially in these regions, technology transfer procedure reaches competitiveness due to the increasing level of employment and the provided competence for individual operation.

In the light of previously presented aspects, we can state that technology transfer is a valuable resource for the case company as it provides the prowess to deal with external threats and opportunities. This procedure does not only enable the effect to SDMP of the decision-makers but, for instance, previously discussed (Chapter 5.3) utilization of strategic alliances can also be stated as the capture of opportunities.

In Chapter 2.3, the second aspect for the value of a resource stated as follows:

“A valuable resource enables better satisfaction to the customer needs.”

Chapter 2.3 presented that this is based on the quality, quantity or costs of a product. Previously in this study, the benefits of technology transfer are discussed with the focus on political factors and advantages for the economy of the receiving region. Additional benefits of technology transfer are gained also through procurement costs, which are lower than the costs of an off-to-shelf product. In the light of this can be stated, that the business environment of the case company has features of Bertrand competition in which the advantage against others is reached through a low-price product (Chapter 2.1.2).

Besides previously presented aspects, Chapter 2.3 determined a difference between exchange value and use value. Exchange value is defined as the monetary amount of a commodity that is concretized when the trade takes place. In other words, this definition refers to the price of a product. This is the value that was discussed with the analyzation of CSL maps (Appendix 2, Appendix 3 and Appendix 4). Use value represents the features of a product through which the response to customer needs is fulfilled. Three different scenarios for the cash flow of the receiving region are presented in Appendix 5 of this study. The aim of this is to visualize concretely the differences between the costs of the procurement in various arrangements.

The first scenario presents an option in which an off-to-shelf product is bought instead of the concept of technology transfer. Thus, in this scenario, the customer does not only pay more for a product (exchange value) but gains less consumer surplus (use value).

According to the literature of Bowman and Abrosini (2000), this scenario presents Product A in Figure 2.3. In Scenario 1, the overall costs of the procurement are the highest.

The second and the third scenarios represent an option which is based on technology transfer. In both, the receiving region reaches both fiscal income and income which is due to further business opportunities. Simultaneously, the receiver pays the licensing fees and goods deliveries (exchange value). Scenario 2 represents a traditional procedure of technology transfer in which the receiver has a role as a licensee and thus is authorized to independent manufacturing and operation. In this scenario besides in addition to the licensing fees, the receiver pays for component deliveries which are produced and then transported from the sending region (the case company). In this scenario, the consumer surplus is increased with fiscal income, which is due to local manufacturing, and further business. Besides fiscal income from the origin region of the receiver, further business opportunities provide an opportunity to reach export earnings if the commodities are distributed globally. According to Chapter 2.3, this scenario presents Product C in Figure 2.3.

The third scenario represents a situation in which the case company has a joint venture in the receiving region. Otherwise, the arrangements in this scenario are the same as in Scenario 2. In the procedure of Scenario 3, the component deliveries do not present as a massive part of the exchange value since these parts are manufactured in the receiving region. Hence, the transfer of these commodities does not consist of such high transportation costs. Moreover, the consumer surplus (fiscal income and further business) is represented to increase as the goods are produced in the local region. This scenario refers to Product D in Figure 2.3 which can be defined as the most desirable from the customer point of view.

Finally, in Chapter 2.3, the third aspect of a valuable resource stated as follows:

“A resource is valuable if it provides a firm a chance to conceive of or implement strategies that tend to increase both efficiency and effectiveness of business.”

Instead of the concept of technology transfer, this aspect refers more to the internal resources of the case company by which this certain procedure can be utilized as the export strategy. As previously presented, the personnel of the company and especially their competence to train foreign employees is the key aspect of technology transfer. Without the competence of the sending region, the receiving region will not have the possibility

to reach prowess for independent operation. Besides the skillful personnel of the company, other internal resources are the ones enabling the transfer of technology. As presented in Chapter 3.2.2, since the case company has identified technology transfer as the core of its business, the company has aimed to determine its facilities to respond to this operation.

If we discuss how technology transfer as a resource is valuable for the company, one important aspect is the possibility and potential benefits of strategic alliances (as shortly mentioned with the discussion about the first aspect for the value of a resource). Since nowadays due to ecosystemic thinking the operation of a company should not be restricted to the interaction between the seller and the buyer, the alliances have a meaningful role in the business of a company. As previously described, strategic alliances may be involved in the process of technology transfer as they have reached a certain competence level and prowess for independent operation. However, via technology transfer, the case company can also reach new alliances for further projects. According to the aspect of third regions in the CSL map (Appendix 4), one can state that if the transfer of technology is executed efficiently to the receiving region, this region can later be utilized as an alliance. This procedure generates benefits to all three parties (sending region, receiving region and third regions).

6. RESULTS

This Chapter compiles the results of this research and the answers to the research questions defined in the beginning of this research in Chapter 1.3:

- *Why does the case company use technology transfer as the export strategy?*
- *How does the case company reach a competitive advantage through technology transfer?*
- *How does the technology transfer generate value-creation for the regions related to this procedure?*

Technology transfer procedure of the case company is presented in Appendix 1. In Appendix 1, the conceptualized structure is formed by the CSL framework and in addition to the structure of the product, it presents other related functions of the company such as process structuring and organization structuring. The CSL was discussed in more detail in Chapter 5 in which the elements of this framework were introduced. The CSL map (Appendix 1) can among other things later be utilized in the case company for forthcoming projects. Furthermore, the modified CSL maps (Appendix 2, Appendix 3 and Appendix 4) provide a base for the evaluation and development of technology transfer related policies and practices in the company.

6.1 Reasoning for the choice as the export strategy

The first research question of this study was:

- *Why does the case company use technology transfer as the export strategy?*

Via technology transfer, the case company aims to reach vantage against its competitors in competitive bidding. Through flexible and customized solutions, the company can effectively fulfil the needs of its potential customers. This requires both agility and continuous awareness of the surroundings in which the company is operating.

In addition to the desired competitive advantage, the case company may execute the transfer of technology due to offset arrangements or requirements related to the maintainability. Offset requirements are defined by counter-trade agreements that legitimate the buyer to benefit from certain activities performed by the seller. Frequently, offsets provide an opportunity for the buyer to absorb foreign core technologies and furthermore, they boost the employment level in the receiving country. Between the states of the EU, offsets are prohibited by Directive 2009/81/EC. In other regions around the globe, these agreements can still occur.

Both previously stated aspects were discussed more specifically in Chapter 3.2.

6.2 Competitiveness and value-creation of technology transfer

The second research question stated as follows:

- *How does the case company reach a competitive advantage through technology transfer?*

Through technology transfer procedure the trade has a positive effect on the economy of the receiving region, and thus creates a good surface for the business negotiations. Additionally, when the procurement is executed by this procedure, the customer gets a tailored product with customized features. Technology transfer also provides the competence for both manufacturing and maintenance of the products and thus, the receiver reaches the prowess for independent operation. In light of these aspects, the technology transfer procedure can be defined as a resource and way of operating by which the company can affect procurements related SDMP in potential customer regions.

The third research question stated as follows:

- *How does the technology transfer of the case company generate value-creation for the parties related to this procedure?*

Previously in this study, three perspectives for value-creation were identified: the sending region, the receiving region and third regions. Moreover, these kept inside varying aspects such as the case company, the manufacturer and foreign industries that were discussed more specifically in Chapter 5. The first aspect (the case company, the industry

and the owners) reaches value through the success in competitive bidding which leads to further activities. In addition to this, the case company may expand its market area due to the reach of new allies in the receiving region. For the second aspect (the state, the manufacturer and the industry), besides the competence for independent operation and the tailored product, the value-creation is materialized through increased employment level at the receiving region. Third regions (the industry and the state) reach value-creation if they are involved in technology transfer procedure of the case company in some other region.

The summary of value-creation for the parties involved in the procedure is presented below in Table 6.1, Table 6.2 and Table 6.3.

Table 6.1. *The summary of value-creation for the sending region.*

The case company	*Competitive advantage, internationalization, global cooperation via alliances, and infrastructure development and prowess*
The industry	*Global customer ships, internationalization, global cooperation via alliances, and infrastructure development and prowess*
The owners	*Profitable business, product development, maintenance prowess, and infrastructure development and prowess*

Table 6.2. *The summary of value-creation for the receiving region.*

The state	*Employment, advanced technology, customized product, maintenance prowess, fiscal income, and infrastructure development and prowess*
The manufacturer	*Employment, advanced technology, income, maintenance prowess, business opportunities, and infrastructure development and prowess*
The industry	*Employment, global customer ships, internationalization, and infrastructure development and prowess*

Table 6.3. *The summary of value-creation for third regions.*

The industry	*Employment, global customer ships and internationalization, income, business opportunities, and infrastructure development and prowess*
The state	*Employment, fiscal income, and infrastructure development and prowess*

As stated in Chapter 5, these aspects kept inside a discussion about the use value of a product. Additionally, in technology transfer the monetary level of exchange value is very important from the customer point of view. This aspect was visualized by comparing three varying scenarios presented in Appendix 5 of this study. These scenarios that provided variable perspectives for total monetary value which is obtained by the customer were discussed in Figure 2.3. The monetary value consists of the direct measurable material and exchange variables, and also non-measurable components (such as transfer of competence and tacit-knowledge, and the creation of mutual trust).

Three scenarios for the procurement were identified to have characteristics of Product A, Product C and Product D (Figure 2.3) that are presented below in Figure 6.1 based on the aspect of Appendix 5.

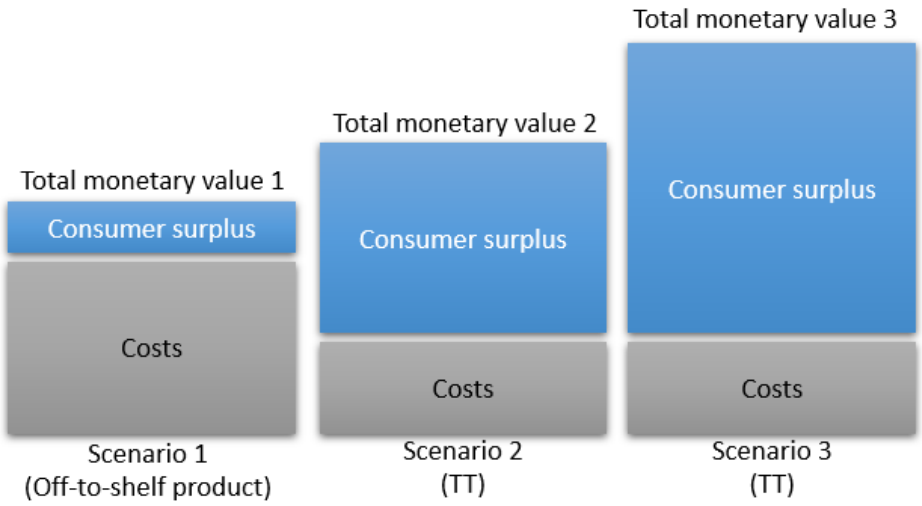

Figure 6.1. *Three scenarios for the procurement.*

Through technology transfer procedure the costs of the procurement decrease and the consumer surplus increases. Consumer surplus consists of such elements as further business opportunities, competence, increased employment, fiscal income and tailored features of the product. An off-to-shelf product option does not only contain less consumer surplus, but also the costs of the procurement are higher too. In Scenario 2 and Scenario 3 the procurement is executed via technology transfer procedure and hence these keep inside an increased amount of consumer surplus. A detailed analysis for all

three scenarios in Figure 6.1 is presented in Chapter 5.5 with the discussion about technology transfer and the RBT.

7. DISCUSSION

7.1 Validity of the results

As the research is executed in a certain company, the results provide only an aspect of technology transfer in this type of a company. Though several organizations have built their operations on this procedure they are not discussed in this study. The sources are provided by the authors and researchers with varying backgrounds and nationalities, and thus they are not limited to Finnish industry. This also provides diversity and different perspectives to the cogitation though the research object is the technology transfer arrangements of a Finnish company. In addition to this, as this procedure increases the internationalization of a company, the sources used give a global viewpoint to this phenomenon.

The results captured by the case study are also based on the operation, processes and lessons learned materials of a certain company. Moreover, the opinions and aspects of employees are considered. The results and analysis of this study are based on the interpretation and notions of the researchers. Due to this, some of the results can be generalized and part of them are context based.

7.2 Relevancy of the results

The results of the theoretical part in this study can be generalized in any company operating in Finnish or foreign industry as the research does not contain quantitative data. The CSL map as a research method can be utilized among technology transfer arrangements of companies in varying fields of business and due to this, the results can be captured through it in different environments. If the results would keep inside quantitative data, they would not present a generalized aspect of the research object.

For the case company, the results are relevant as the study provides an overall presentation to the nature of its business and its value-creation. Furthermore, the study gives varying perspectives to the execution of technology transfer, for instance, in a situation where the facilities and competence of previous customers could be utilized in the programs and projects of the case company.

The study also highlights the difference between the micro environment and macro environment that concretizes which factors of these the company can control. Moreover, the study shows that though the company does not have the control over the factors of macro environment (e.g. social, political, legal), it still has space to operate within the limits set by this environment through competitive business strategy (for instance, transferring technology instead of an off-to-shelf product).

7.3 Novelty of the results

This case study gives new aspects to the technology transfer of a certain region (Finland) and the results can also be generalized and utilized in a global context. The perspective of the study is ecosystemic. It discusses the phenomenon from three aspects (the sending region, the receiving region and third regions) that keep inside several organizations that can be located all around the globe. Due to this can be stated, that the study and its results are significant for both the literature and industry. At this point it is meaningful to notice that for instance, the offset related literature deals with the benefits gained by both the sending region and the receiving region. However, this literature generally focuses on two nations while this study incorporates the third region into the aspect.

From the perspective of the case company the study and its results are interesting as they provide a comprehensive discussion about the phenomenon. For the company, the study represents an overview of the core of its business as the aim is to execute new programs and projects through technology transfer arrangements. Moreover, as a result of this study, the company may detect possible development areas in its operation.

As a conclusion can be stated, that the study brings a recent approach to the procedure of technology transfer in the Finnish industry. Due to its ecosystemic nature, it is also timely as it shows how companies can adapt themselves in global business and rapidly changing business environments. Moreover, the research is engrossing to Tampere University as it represents new research among this phenomenon.

8. CONCLUSIONS

Technology transfer refers to an action in which technology is transferred from its origin to another organization. This study investigated a procedure that contains cross-border movement of technology. On the other hand, technology transfer can also be executed within a state if a company, for instance, decides to build a factory in a new area. According to the literature review, two types of transfers can be identified: vertical and horizontal. Vertical technology transfer covers the transfer of technology from R&D departments and universities to commercial applications. This study discussed horizontal technology transfer which is characterized by the movement of technology between nations and companies. Depending on the country or the industry, companies have different motives for this procedure. For the case company of this study, the motive is the desirable competitive advantage provided by technology transfer. This is due to the business environment of the company which is defined as differentiated oligopoly characterized by political decision-making.

Since technology has different embodiments (hard technology and soft technology), the transfer can be executed through varying channels such as FDI, strategic alliances, movement of personnel and licensing. Moreover, the transfer type can be categorized as material-transfer, design-transfer, capacity-transfer or employees-transfer. Technology transfer procedure of the case company keeps inside both hard and soft technology. Additionally, the transferable objects can be sorted to all four previously mentioned categories.

The core of technology transfer arrangements of the case company is the high-tech product that can be tailored for the exact needs of the customer. In addition to this, the skillful personnel and their prowess to share knowledge within foreign employees is the key factor in technology transfer arrangements of the case company. Most of this know-how is so-called tacit knowledge and frequently, according to the literature, capability gaps and challenges are related to the transfer of this component. Tacit knowledge is a component of soft technology and is defined as know-how which is complicated to verbalize. This component occurs via informally learned behavior and procedures of individuals while fulfilling everyday work duties. Almost without an exception, the transfer of this knowledge requires face-to-face interaction. The comprehensive transfer of this know-how is presented to lead the more effective transfer of manufacturing technology as well.

Thus, this component has a significant role in fields of organizational learning and economic competitiveness. In this study is it suggested that besides training, the efficient transfer of tacit knowledge may require permanent or temporary movement of employees from the sender to the receiver.

Cross-border technology transfer is not restricted between two regions as the arrangements have effects to third regions as well. Due to this, the value-creation of this procedure was observed from three perspectives: the sending region, the receiving region and third regions. This refers to modern ecosystemic business thinking. By this it is suggested, that the operation of a company should not be restricted to the interaction between the buyer and the seller as the business involves third parties as well. However, if an off-to-shelf product was offered to the customer instead of the concept of technology transfer, the role of the third regions decreases in the value creation.

From the customer point of view, the most attractive benefits reached through technology transfer arrangements are the increased employment level of the region and the competence for independent operation by which further business opportunities can be reached as well. Additionally, the costs of the procurement decrease compared to an off-to-shelf option.

In light of this study, technology transfer can be stated as an effective strategy for a company which is operating in this certain business environment. In addition to this, the efficiency of technology transfer can be observed in other market structures as well. As the environment of the case company is characterized by political behavior and policies besides political risks, can be suggested that these aspects could be investigated in forthcoming studies among this topic. An organization such as the case company of this study should have the competence to prepare its business to manage political surroundings in varying countries besides the traditional business environment. This does not necessarily mean that the company should have tools by which it may affect the outcome of SDMP but the awareness about the current or moreover forthcoming situation should be able to retain.

Since nowadays the business environment is characterized by previously stated ecosystemic business thinking, another aspect suggested for forthcoming researches could be related to strategic alliances. These alliances were identified to have a significant role in technology transfer procedure and furthermore, part of the value-creation is generated by their activities. Strategic alliances do not only have a role in the arrangements of

technology transfer, but they could also be related to the share of knowledge within the organizations.

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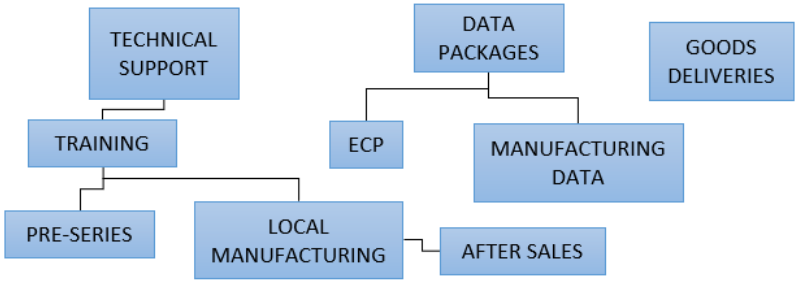

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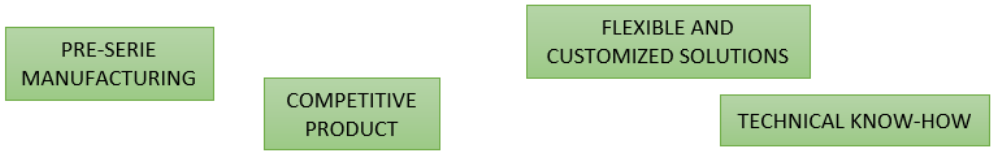

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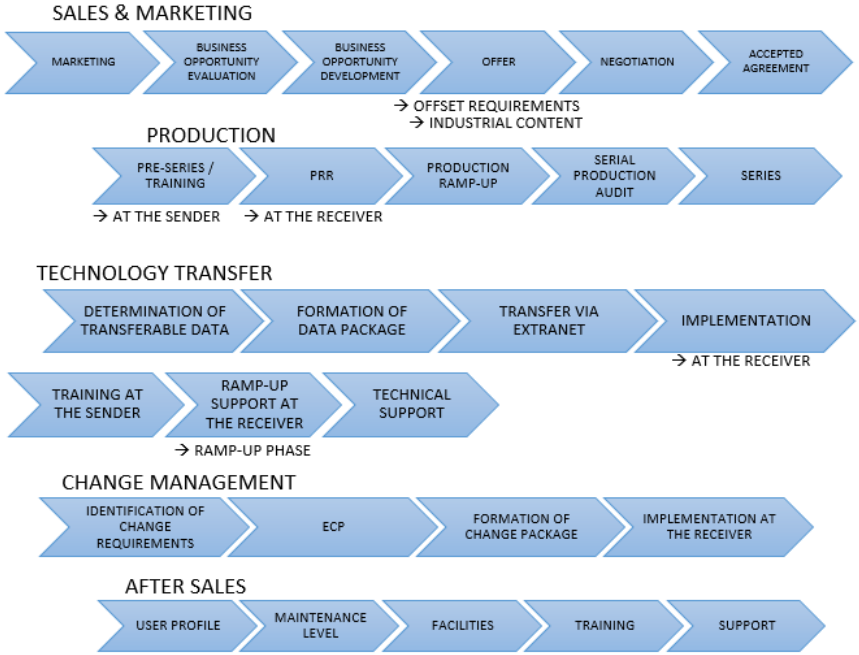

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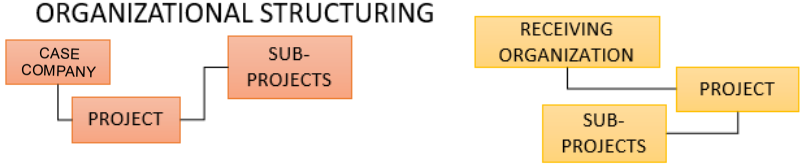

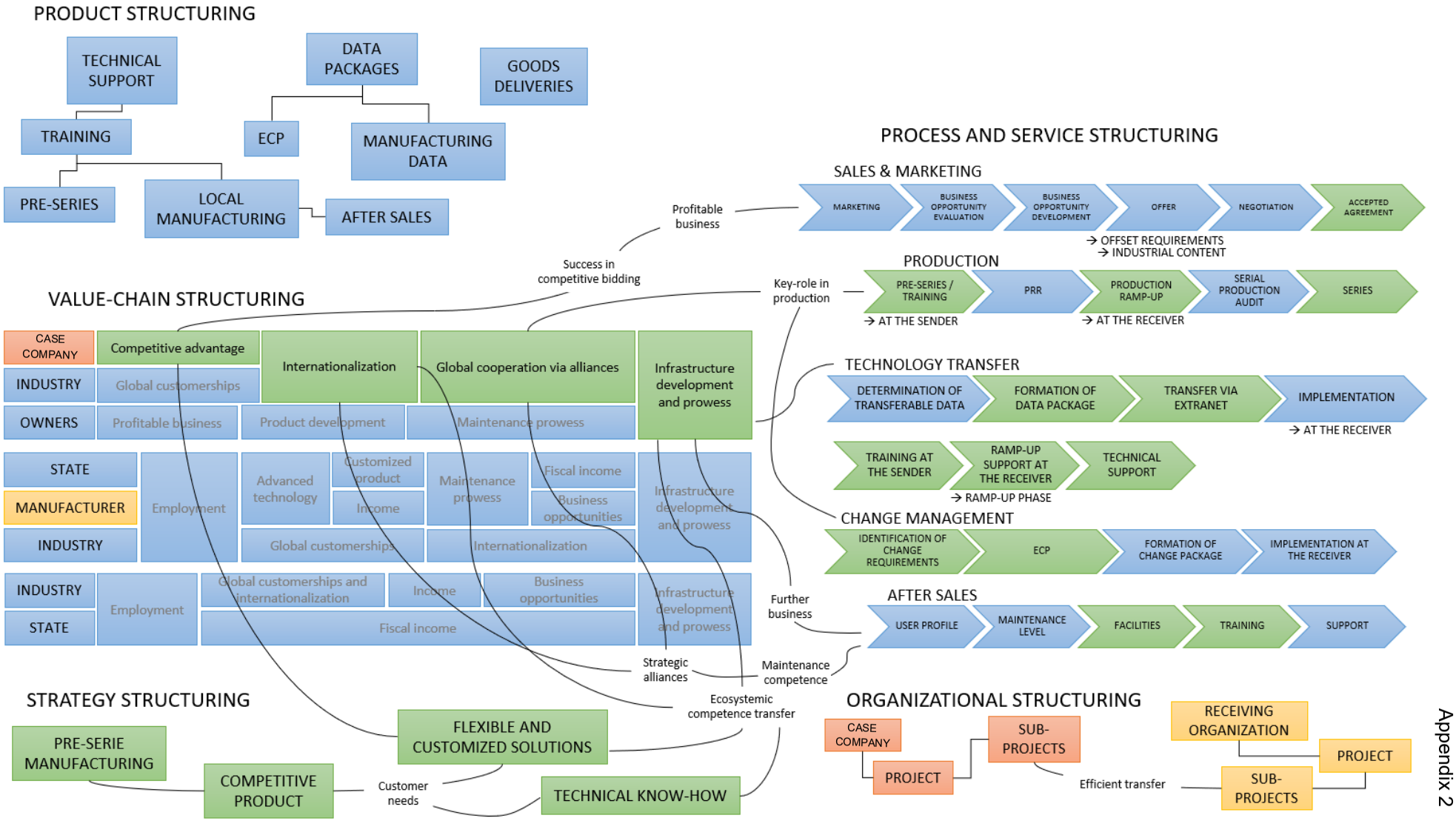
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BUSINESS OPPORTUNITY EVALUATION
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→ INDUSTRIAL CONTENT
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PRODUCTION RAMP-UP
SERIAL PRODUCTION AUDIT
SERIES
→ AT THE SENDER
→ AT THE RECEIVER
TECHNOLOGY TRANSFER
DETERMINATION OF TRANSFERABLE DATA
FORMATION OF DATA PACKAGE
TRANSFER VIA EXTRANET
IMPLEMENTATION
→ AT THE RECEIVER
TRAINING AT THE SENDER
RAMP-UP SUPPORT AT THE RECEIVER
TECHNICAL SUPPORT
→ RAMP-UP PHASE
CHANGE MANAGEMENT
IDENTIFICATION OF CHANGE REQUIREMENTS
ECP
FORMATION OF CHANGE PACKAGE
IMPLEMENTATION AT THE RECEIVER
AFTER SALES
USER PROFILE
MAINTENANCE LEVEL
FACILITIES
TRAINING
SUPPORT
Profitable business
Success in competitive bidding
Key-role in production
Further business
Strategic alliances
Maintenance competence
Ecosystemic competence transfer
VALUE-CHAIN STRUCTURING
SENDING REGION
CASE COMPANY
INDUSTRY
OWNERS
Competitive advantage
Global customerships
Profitable business
Internationalization
Product development
Global cooperation via alliances
Maintenance prowess
Infrastructure development and prowess
RECEIVING REGION
STATE
MANUFACTURER
INDUSTRY
Employment
Advanced technology
Customized product
Income
Maintenance prowess
Fiscal income
Business opportunities
Global customerships
Internationalization
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Customer needs
FLEXIBLE AND CUSTOMIZED SOLUTIONS
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CASE COMPANY
PROJECT
SUB-PROJECTS
Efficient transfer
RECEIVING ORGANIZATION
PROJECT
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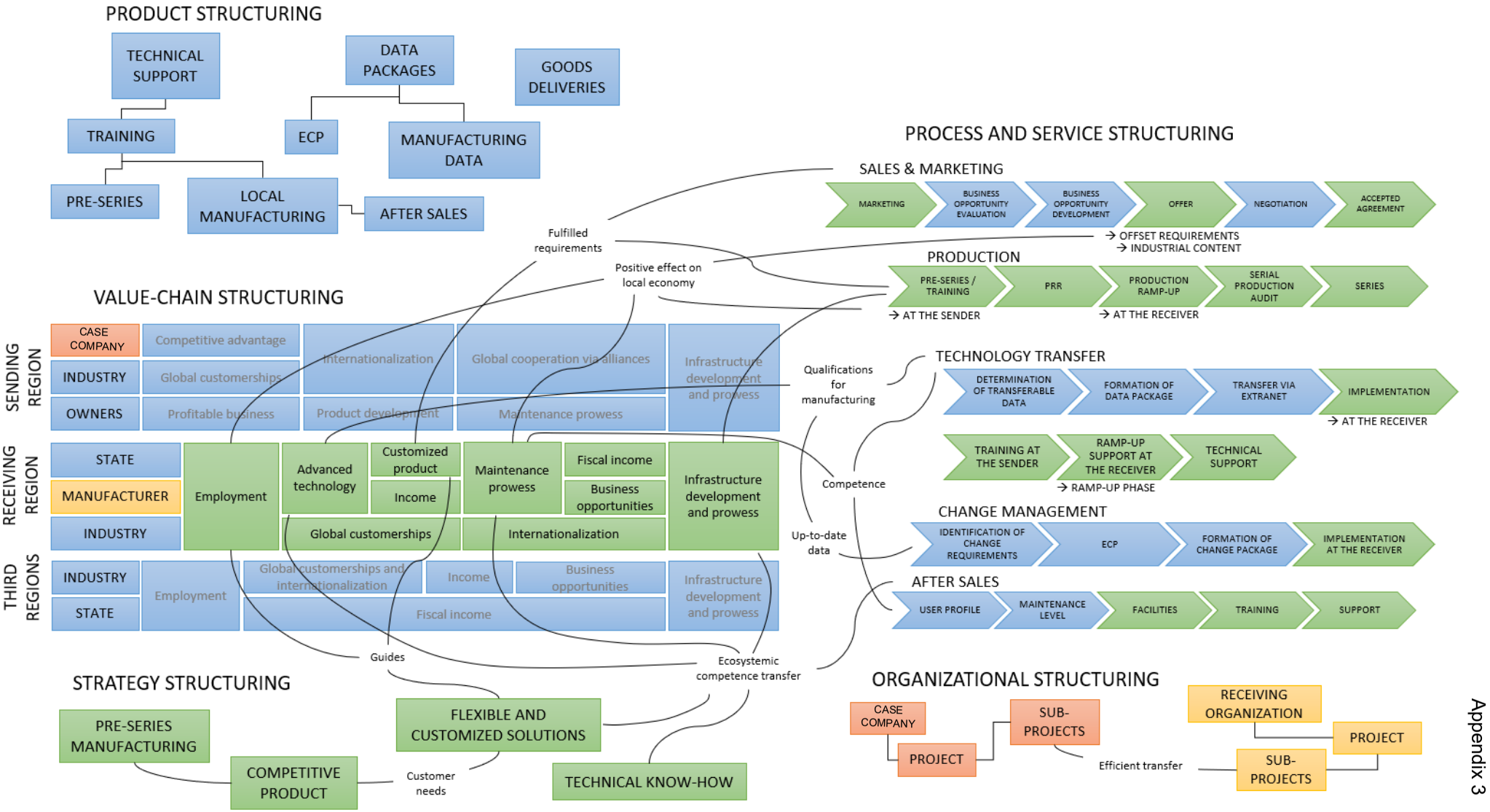
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ACCEPTED AGREEMENT
→ OFFSET REQUIREMENTS
→ INDUSTRIAL CONTENT
Fulfilled requirements
Positive effect on local economy
PRODUCTION
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SERIAL PRODUCTION AUDIT
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→ AT THE SENDER
→ AT THE RECEIVER
VALUE-CHAIN STRUCTURING
SENDING REGION
CASE COMPANY
INDUSTRY
OWNERS
Competitive advantage
Global customerships
Profitable business
Internationalization
Product development
Global cooperation via alliances
Maintenance prowess
Infrastructure development and prowess
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INDUSTRY
Employment
Advanced technology
Customized product
Income
Maintenance prowess
Fiscal income
Business opportunities
Global customerships
Internationalization
Infrastructure development and prowess
TRAINING AT THE SENDER
RAMP-UP SUPPORT AT THE RECEIVER
TECHNICAL SUPPORT
→ RAMP-UP PHASE
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IMPLEMENTATION AT THE RECEIVER
Up-to-date data
THIRD REGIONS
INDUSTRY
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Employment
Global customerships and internationalization
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Business opportunities
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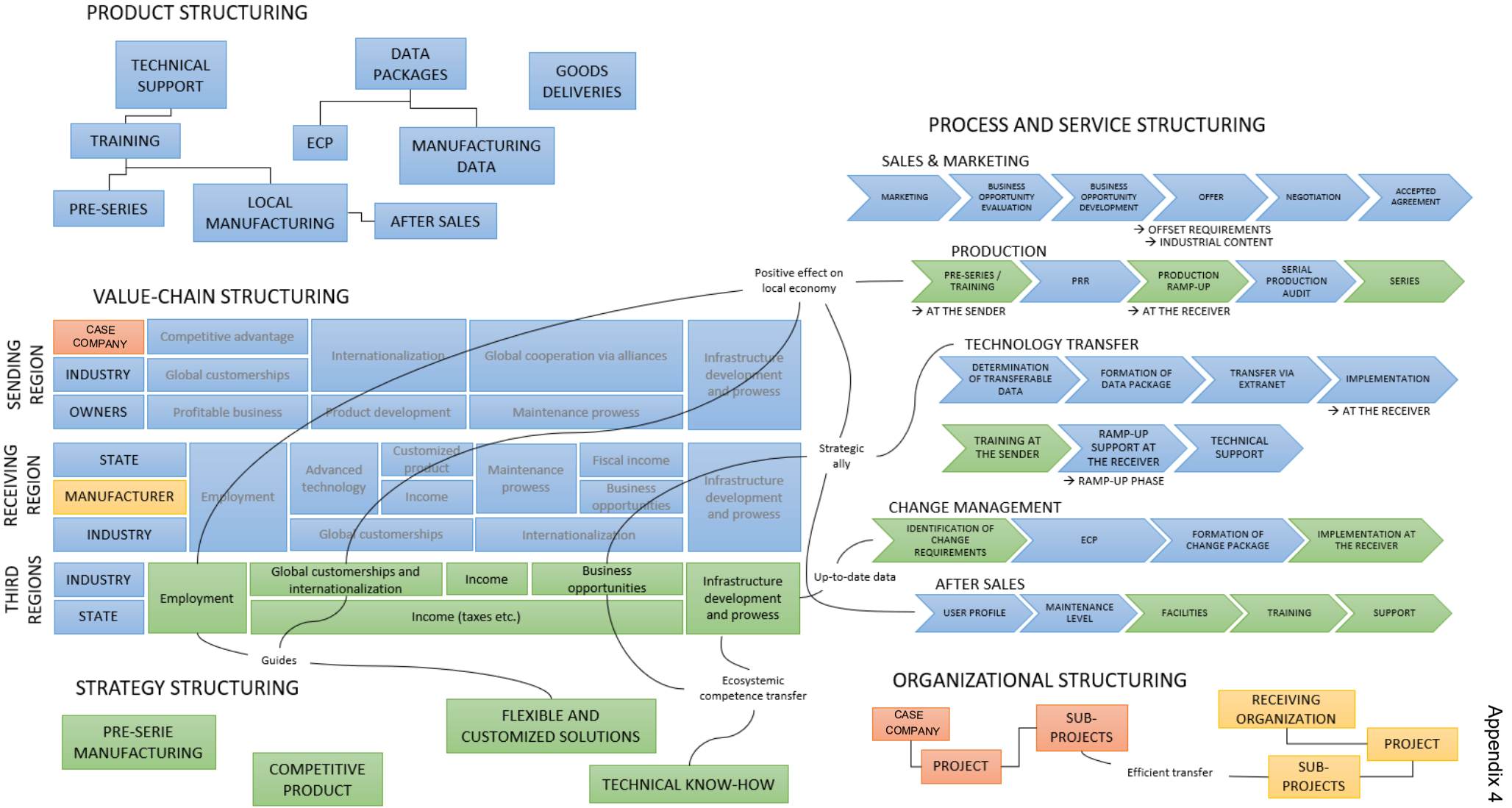
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BUSINESS OPPORTUNITY EVALUATION
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→ AT THE SENDER
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Positive effect on local economy
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Maintenance prowess
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Customized product
Income
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Business opportunities
Internationalization
Infrastructure development and prowess
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TRAINING AT THE SENDER
RAMP-UP SUPPORT AT THE RECEIVER
TECHNICAL SUPPORT
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ECP
FORMATION OF CHANGE PACKAGE
IMPLEMENTATION AT THE RECEIVER
THIRD REGIONS
INDUSTRY
STATE
Employment
Global customerships and internationalization
Income (taxes etc.)
Income
Business opportunities
Infrastructure development and prowess
Up-to-date data
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Ecosystemic competence transfer
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ORGANIZATIONAL STRUCTURING
CASE COMPANY
PROJECT
SUB-PROJECTS
Efficient transfer
RECEIVING ORGANIZATION
PROJECT
SUB-PROJECTS

Appendix 5

OFF-TO-SHELF
TECHNOLOGY TRANSFER
Scenario 1
Scenario 2
Scenario 3
Exchange value, price of a product
Licensing fee
Goods deliveries (manufactured at the sender)
Fiscal income
Further business
Fiscal income
Further business
Goods deliveries (manufactured at the receiver)
Licensing fee
Costs
Income